Праці науковців МНАУ у наукометричних базах даних Scopus та Web of Science

Міністерство освіти і науки України
Миколаївський національний аграрний університет

Бібліотека

Праці науковців МНАУ у наукометричних базах даних Scopus та Web of Science

Рекомендаційний покажчик літератури

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Найбільш авторитетними наукометричними базами нині є Web of Science та SCOPUS. Кількість публікацій науковців Миколаївського національного аграрного університету у міжнародних наукових базах даних Scopus та Web of Science постійно зростає.

Бібліографічний покажчик "Праці науковців МНАУ у наукометричних БД Scopus та WOS" містить інформацію про опубліковані статті з 2001 року.

ПЕРЕДМОВА

Бібліографічний покажчик "Праці науковців МНАУ у наукометричних базах даних Scopus та Web of Science" містить інформацію про опубліковані статті в міжнародних наукометричних базах даних.

Матеріали у покажчику розміщено за хронологією видань, в межах року - заалфавітом авторів та назв публікацій. Опис документів наведено за Національним стандартом України ДСТУ 8302:2015 (загальні правила). Видання має іменний покажчик.

Бібліографічний покажчик адресований науковцям, спеціалістам сільського господарства, аспірантам, викладачам, студентам, а також тим, хто цікавиться розвитком сучасної аграрної науки в Україні та за її межами.

ВСТУП

Стрімкий розвиток інформаційного суспільства визначає нові вимоги до публікаційної активності викладачів університетів. Наукова публікаційна активність учених сьогодні є важливим критерієм оцінювання ефективності наукової роботи і діяльності наукової установи в цілому, одним із показників доцільності надання фінансування на проведення наукових досліджень. Наслідком наукової діяльності є науковий результат, а саме нове наукове знання, одержане в процесі фундаментальних або прикладних наукових досліджень та зафіксоване на носіях інформації.

Науковий результат може бути у формі звіту, опублікованої наукової статті, наукової доповіді, наукового повідомлення про науково-дослідну роботу, монографічного дослідження, наукового відкриття, проекту нормативно-правового акта, нормативного документа або науково-методичних документів, підготовка яких потребує проведення відповідних наукових досліджень або містить наукову складову, тощо. Міжнародна практика наукометричних досліджень нині базується на використанні наукометричних баз даних. Кожна така база — це бібліографічна і реферативна база даних з інструментами для відстеження цитованості статей, опублікованих у наукових виданнях, з можливістю індексування посилань, зазначених у пристатейних списках цих публікацій, та розрахунку кількісних показників посилань.

Завдяки НМБД можна оцінити продуктивність праці вчених, наукову діяльність дослідницьких груп чи країн, де використовується індекс цитування, оцінити вплив вченого або організації на світову науку, що опо-

середковано може свідчити про якість наукових досліджень. Найбільш авторитетними наукометричними базами нині є Web of Science та SCOPUS.

Кількість публікацій науковців Миколаївського національного аграрного університету у міжнародних наукових базах даних Scopus та Web of Science постійно зростає. Бібліографічний покажчик "Праці науковців МНАУ у наукометричних БД Scopus та WOS" містить інформацію про опубліковані статті з 2000 року.

Праці науковців МНАУ у наукометричній базі даних Scopus

2000 рік

1. Chernov V. Yu. Fracture of welds in gas and petroleum mains. *Materials Science*. 2000. Vol. 36, Issue 3. P. 477-479. DOI: 10.1007/BF02769616.

2001 рік

2. Chernov V.Yu. Influence of oxygen and hydrogen sulfide on the carbonic-acid corrosion of welded metal structures of oil and gas equipment. *Materials Science*. 2001.Vol. 37, Issue 5. P. 808-815. DOI: 10.1023/A:1015008812207.

3. Effect of modifying additions on the ductility and plastic properties and the brittle strength of cold-resistant, low-alloy steel / V. D. Makarenko etc. *Welding International*. 2001. Vol.15, Issue 1. P. 45-51. DOI: 10.1080/09507110109549315.

4. Effect of modifying microadditions on the mechanical and ductility properties of welded joints in oil and gas pipelines / Makarenko V. D. etc. *Welding International*. 2001. Vol. 15, Issue 10. P. 808-811. DOI: 10.1080/09507110109549446.

2002 рік

5. Chernov V. Y., Makarenko V. D., Kryzhanivs'kyi E. I., Shlapak L. S. On the causes of corrosion fracture of industrial pipelines. *Materials Science*. 2002. Vol. 38, Issue 6. P. 880-883. DOI: 10.1023/A:1024224204487.

It is established that the most active corrosion components in gas-water-oil environment are hydrogen sulfide, carbon dioxide, oxygen, and mineral salts (especially chlorides). The main types of corrosion fracture of the metalware of oil and gas objects, in particular, industrial pipelines, exploited under severe climatic conditions, are static and cyclic hydrogen fatigue, sulfide cracking, and local (pitting and groove) corrosion.

6. Chernov V. Y., Makarenko V. D., Kryzhanivs'kyi E. I., Shlapak L. S. Causes and mechanisms of local corrosion in oil-field pipelines. *Materials Science*. 2002. Vol. 38, Issue 5. P. 729-737. DOI: 10.1023/A:1024274726352.

We study the causes and reveal the mechanism of local corrosion of carbon steels in the presence of high amounts of water in the extracted oil, present the results of evaluation of the index of activity and the quantitative level of infection of oil-field pipelines with microorganisms, and consider the mechanism of development of corrosion damage to the body of the pipe in the form of pitting. The most probable chemical reactions of local corrosion are analyzed.

7. Chernov V. Yu. Evaluation of the corrosion resistance of pipes made of carbon low-alloy steels. *Materials Science*. 2002. Vol. 38, Issue 1. P. 132-135. DOI: 10.1023/A:1020193303316.

8. Chernov V. Yu.Influence of microadditions on the resistance to brittle fracture of welded joints of oil pipelines. *Materials Science*. 2002. Vol. 38, Issue 3. P. 449-454. DOI: 10.1023/A:1021798322401.

On the basis of the results of testing of influence of modifying microadditions (Ce, Y, Ba, Ca, and Zr) on the characteristics of the resistance to brittle fracture of a weld metal of welded joints of oil-and-gas pipelines, their optimal content in welds is determined. We propose mathematical models for numerical prediction of the crack resistance of welded joints.

9. Prosandyeyeva A. A., Smirnova M. K., Yu G. I. Effect of some biologically active substances and acetone on chlorophyll content in germ leaves of tomato and Cucurbitaceae in vitro. *Biopolymers and Cell*. 2002. Vol. 18, Issue 6. P. 496-499.

A possibility to increase the chlorophyll content in Ucopersicon esculentum L., Cucurbita pepo L. by certain concentrations of kinetin, antioxidant ionol, acetone in medium is shown. Acetone is shown to rise the dry matter content in Cucurbita pepo. A similarity in chemical structures of the kinetin and ionol molecules is revealed using the Chem Office Pro program.

2003 рік

10. Chernov V. Yu., Makarenko V. D., Shlapak L. S. Role of hydrogen in the sulfide stress-corrosion cracking of pipeline steels. *Materials Science*. 2003. Vol. 39, Issue 1, 2. P. 144-147. DOI: 10.1023/A:1026151118353.

11. Makarenko V. D., Makarenko I. O., Chernov V. Yu., Petrovskii V. A. Corrosion and mechanical resistance in oil borehole equipment. *Chemical and Petroleum Engineering*. 2003. Vol. 39, Issue 9-10. P. 557-562.

12. Makarenko V. D., Petrovs'kyi V. A., Chernov V. Yu. Mechanism of hydrogen delamination of pipe steels of oil and gas pipelines. *Materials Science*. 2003. Vol. 39, Issue 6. P. 895-900. DOI: 10.1023/B:MASC.0000031657.38517.0f.

We propose a mechanism of hydrogen delamination of pipe steels of oil and gas pipelines and study the influence of nonmetallic inclusions and hydrogen on the initiation of microcracks playing the role of nuclei of delamination of pipe steels.

2004 рік

13. Popov V. N., Kramarenko S. S. Dispersal of land snails of the genus Xeropicta Monterosato, 1892 (Gastropoda; Pulmonata; Hygromiidae). *Russian Journal of Ecology*. 2004. Vol. 35, Issue 4. P. 263-266. DOI: 10.1023/B:RUSE.0000033797.51636.83.

14. Welding nonrotating joints in petroleum pipelines / Makarenko V. D. etc. *Chemical and Petroleum Engineering*. 2004. Vol. 40, Issue 5-6. P. 307-309. DOI: 10.1023/B:CAPE.0000039674.38322.dc.

2007 рік

15. Kramarenko S. S., Khokhutkin I. M., Grebennikov M. E.Specific features of phenetic structure of the terrestrial snail Cepaea vindobonensis (Pulmonata; Helicidae) in urbanized and natural populations. *Russian Journal of Ecology*. 2007. Vol. 38, Issue 1. P. 39-45. DOI: 10.1134/S1067413607010079.

The phenetic structure of natural and urbanized populations of the terrestrial snail Cepaea vindobonensis has been studied with respect to polymorphism in the shell-band color and pattern. It is noted that C. vindobonensis snails populating different artificial habitats in the city of Nikolaev and its suburbs are characterized by a higher level of both intra-and interpopulation diversity with respect to the type of this polymorphism. In addition, urban populations show a very wide range of variation in the frequencies of particular morphs or their groups. Conversely, natural populations are characterized by a more uniform frequency structure with respect to polymorphism of the shell banding pattern.

16. Pastushenko S., Dumenko K. Mathematical design of process of dynamic «Shaking» off pepper seeds from car-

pels. *3rd International Conference Trends in Agricultural Engineering 2007*, TAE 2007; Prague; Czech Republic; 12-14 September 2007. P. 351-354. URL: https://www.scopus.com/record/display.uri?eid=2-s2.0-84900414090&origin=resultslist&sort=plf-t&src=s&nlo=&nlr=&nls=&sid=bf15f1050202a48bf13961452ca281d0&sot=aff&sdt=cl&cluster=scopubyr%2c%222014%22%2ct%2c%222007%22%2ct&sl=56&s=AF-ID%28%22Mykolayiv+National+Agrarian+University%22+60108748%29&relpos=0&citeCnt=0&searchTerm=.

A mathematical model of process of the dynamic shaking off the pepper seeds from a carpel with the determination of the contact tension of destruction of the seeds-carpels connection has been developed.

2008 рік

17. Vakhonina L. V., Popov V. G. Flexural vibrations of a thin circular elastic inclusion in an unbounded body under the action of a plane harmonic wave. *International Applied Mechanics*. 2008. Vol. 44, Issue 5. P. 493-497. DOI: 10.1007/s10778-008-0061-y.

The interaction of a plane harmonic longitudinal wave with a thin circular elastic inclusion is considered. The wave front is assumed to be parallel to the inclusion plane. Since the inclusion is thin, the matrix-inclusion interface conditions (perfect bonding) are formulated on the mid-plane of the inclusion. The bending displacements of the inclusion are determined from the bending equation for a thin plate. The problem is solved using discontinuous Lamé solutions for harmonic vibrations. Therefore, the problem can be reduced to the Fredholm equation of the second kind for a function associated with the discontinuity of normal stresses on the inclusion. The equation obtained is solved by the method of mechanical quadratures using Gaussian quadrature formulas. Approximate formulas for the stress intensity factors are derived. Re-

sults from a numerical analysis of the dependence of the SIFs on the dimensionless wave number and the stiffness of the inclusion are presented.

2009 рік

18. Atamanyuk I. P. Optimal polynomial extrapolation of realization of a random process with a filtration of measurement errors. *Journal of Automation and Information Sciences*. 2009. Vol. 41, Issue 8. P. 38-48. DOI: 10.1615/JAutomatInfScien.v41.i8.40.

The polynomial algorithm of optimal extrapolation of a random process with a filtration of measurement errors is obtained. The forecasting algorithm, as well as the canonical expansion, taken as a basis, does not impose any significant restrictions on the class of the studied random processes (linearity, Markov property, stationarity, monotony, etc.).

19. Vakhonina L. V., Popov V. G.Interaction of harmonic axisymmetric waves with a thin circular absolutely rigid separated inclusion. *Mechanics of Solids*. 2009. Vol. 44, Issue 2. P. 294-302. DOI: 10.3103/S0025654409020150.

We study stress concentration near a circular rigid inclusion in an unbounded elastic body (matrix). In the matrix, there are wave motions symmetric with respect to the axis passing through the inclusion center and perpendicular to the inclusion. It is assumed that one of the inclusion sides is completely fixed to the matrix, while the other side is separated and the conditions of smooth contact are realized on that side. The solution method is based on the fact that the displacements caused by waves reflected from the inclusion are represented as a discontinuous solution of the Lamé equations. This permits reducing the original problem to a system of singular integral equations for functions related to the stress and displacement jumps on the inclusion. Its solution is constructed approximately by the collocation method with the

use of special quadrature formulas for singular integrals. The approximate solution thus obtained permits numerically studying the stress state in the matrix near the inclusion. Technological defects or constructive elements in the form of thin rigid inclusions contained in machine parts and engineering structure members are stress concentration sources, which may result in structural failure. It is shown that the largest stress concentration is observed near separated inclusions. Static problems for elastic bodies with such inclusions have been studied rather comprehensively [1, 2]. The stress concentration near separated inclusions under dynamic actions on the bodies has been significantly less studied even in the case of harmonic vibrations. The results of these studies can be found in [3, 4], where bodies with a thin separated inclusion were considered, and in [5], where the problem about torsional vibrations of a body with a thin circular separated inclusion was studied. The aim of the present paper is to study stress concentration near such an inclusion in the case of interaction with harmonic waves under axial symmetry conditions.

2011 рік

20. Atamanyuk I. P. Algorithm to determine the optimal parameters of a polynomial Wiener filter-extrapolator for nonstationary stochastic processes observed with errors. *Cybernetics and Systems Analysis*. 2011. Vol. 47, Issue 2. P. 305-310. DOI: 10.1007/s10559-011-9312-8.

The apparatus of canonical expansions of stochastic processes is used to obtain an algorithm to determine the optimal parameters of a discrete polynomial Wiener filter-extrapolator for nonstationary stochastic processes with errors.

21. Kramarenko S. S., Leonov S. V. Phenetic population structure of the land snail Helix albescens (Gastropoda,

Pulmonata, Helicidae) in the Crimea. *Russian Journal of Ecology*. 2011. Vol 42, Issue 2. P. 170-177. DOI: 10.1134/S1067413611020068.

The polymorphism of shell banding pattern has been studied in Crimean populations of the land snail H. albescens. The results show that snails from different regions of the Crimea are characterized by specific types of shell polymorphism, the differences between them concerning mainly the number of observed shell morphs rather than their occurrence frequency. In particular, the proportion of snails with darkly colored shells increases in relatively cool habitats. However, among the microevolutionary processes determining the type and degree of polymorphism in H. albescens populations, a major role is also played by stochastic genetic phenomena, because the species exists in semi-isolated colonies with low effective abundance and high risk of local extinction.

22. Popov V. G., Vakhonina L. V. Axisymmetric vibrations of an infinite body with a thin elastic circular inclusion under conditions of smooth contact. *Journal of Mathematical Sciences*. 2011. Vol.176, Issue 5. P. 601-615. DOI: 10.1007/s10958-011-0425-4.

We solve an axisymmetric problem of the interaction of harmonic waves with a thin elastic circular inclusion located in an elastic isotropic body (matrix). On both sides of the inclusion, between it and the body (matrix), conditions of smooth contact are realized. The method of solution is based on the representation of displacements in the matrix in terms of discontinuous solutions of Lamé equations for harmonic vibrations. This enables us to reduce the problem to Fredholm integral equations of the second kind for functions related to jumps of normal stress and radial displacement on the inclusion.

23. Tarasov A. Coherent quantitative analysis of risks in agribusiness: Case of Ukraine. *Agris On-line Papers in Economics and Informatics*. 2011. Vol. 3, Issue 4. P. 23-29.

URL: https://www.scopus.com/record/display.uri?eid=2-s2.0-84863215089&origin=resultslist&sort=plf-t&src=s&nlo=&nlr=&nls=&sid=75b40ad64fa3b995acd8e299be08bd97&sot=aff&sdt=cl&cluster=scopubyr%2c%222011%22%2ct&sl=56&s=AF-ID%28%22Mykolayiv+National+Agrarian+University%22+60108748%29&relpos=4&citeCnt=2&searchTerm=.

Modern methods of quantitative risk analysis, specifically value-at-risk and expected shortfall approach, provide comprehensive and coherent risk evaluation throughout entire distribution of outcomes and can take agricultural business from the realm of uncertainty to specific, quantified risks. Monte Carlo simulation with autocorrelation of standard deviation shows the best results in risk modeling and is used for this research. The analysis showed that production risk is systemic within climatic regions of Ukraine with coefficients of correlation ranging from 0.25 to 0.85. Yield correlation among crops in several oblasts is low to negative, creating opportunities for diversification. However, positive price-yield correlation is dominant for agricultural products in Ukraine due to high dependency on global prices and a large share of export. It is hypothesized that price-yield correlation is directly proportional to the share of country's international trade in that agricultural product.

24. The chemical content of different energy crops / Poiša L. etc. *Vide. Tehnologija. Resursi - Environment, Technology, Resources*. 2011. Vol. 1. P.191-196.

The paper presents the data of gaseous and alkali elements in above-ground biomass of energy crops. The investigations objects were Phalaris arundinacea L., Populus nigra, Artemisia vulgaris, Sylphium perfoliatum, Sida hermaphrodita, Dactylis glomerata, Salix viminalis, Medicago sativia L. The aim of the research: to evaluate the amount of chemical elements in energy crops. Evaluating the energy crops it can be

seen, that the most alkaline metals are contained in Sida hermaphrodita, and the least in Sylphium perfoliatum L.

2012 рік

25. Atamanyuk I. P., Kondratenko V. Y., Kozlov O. V., Kondratenko Y. P. The algorithm of optimal polynomial extrapolation of random processes. *Lecture Notes in Business Information Processing*. 2012. Vol.115 LNBIP. P. 78-87. DOI: 10.1007/978-3-642-30433-0_9.

This work deals with the modelling and prediction of the realizations of random processes in corresponding future time moments. The extrapolation algorithm of nonlinear random process for arbitrary quantity of known significances and random relations used for forecasting has been received on the basis of mathematical instrument of canonical decomposition. The received optimal solutions of the nonlinear extrapolation problem, as well as the canonical decomposition, that was use as a base for optimal solution, does not set any substantional restrictions on the class of investigated random process (liniarity, Markov processes propety, stationarity, monotonicity etc.). Theoretical results, block-diagrams for calculation procedures and the analysis of applied applications, especially for the prediction of economic indexes and parameters of technical devices, are under discussions.

26. Dubinina M. V. Institutional analysis of transformations in Ukrainian agriculture. *World Applied Sciences Journal*. 2012. Vol. 18, Issue SPL.ISSUE. 18. P. 185-190. DOI: 10.5829/idosi.wasj.2012.18.120031.

Institutional character of systematic problems, directions and ways for realization of agrarian reforms in Ukraine were determined as a social process of institutional development based on the ideology of forming and deepening of market relations. The necessity of institutional investigations of transformations in the agrarian sector of Ukrainian economy

was substantiated. The environment of the institutes forming the institutional map in the whole was identified. The institutional essence of the crisis in the agrarian sector of economy was analyzed. Various factors that may potentially lead to the changes in the institutional structure were generalized. Main problems for applied institutional analysis were identified. The aggregate of features characterizing the institutes of the agrarian sector was formulated. For agricultural enterprises the authors have identified an approach implying that the institutional analysis should be performed in relation to the enterprise subsystems on the process characteristic. The methodological and methodical bases of institutional analysis for efficiency evaluation and modeling of socio-economic process in agriculture are presented.

27. Dubovenko K. V. Gasodynamical characteristics of electrical discharges in the pulsed Plasma generator with inductive and capacitive energy store. *Technical Electrodynamics*. 2012. Issue 6. P. 11-18. URL: https://www.scopus.com/record/display.uri?eid=2-s2.0-84874952148&origin=resultslist&sort=plf-t&src=s&nlo=&nlr=&nls=&sid=70074bdd0497c93ccfa715a559418d2f&sot=aff&sdt=cl&cluster=scopubyr%2c%222012%22%2ct&sl=56&s=AF-ID%28%22Mykolayiv+National+Agrarian+University%22+60108748%29&relpos=0&citeCnt=0&searchTerm=.

Numerical simulation of powerful electrical discharges in the air in the circuit with the inductive and capacitive energy store and electroexplosive opening switch has been carried out with one-dimensional magnetohydrodynamic approach. Electrical, energetical and gasodynamical characteristics of the discharge have been obtained. With accounting for the electrical processes and electrical energy dissipation in the plasma load the analysis of the gasodynamical transients has been carried out. In particular, spatial and temporal dependencies of the medium pressure, velocity and density under conditions of the magnetic pressure and discharge current skinning influence have been shown.

2013 рік

28. Butakov B. I., Marchenko D. D. Promoting contact strength of steel by rolling. *Journal of Friction and Wear*. 2013. Vol. 34, Issue 4. P. 308-316. DOI: 10.3103/S106836661304003X.

The article deals with findings of experimental research on the running-in process of steel pieces with rollers that harden the contact strength. The hardening effectiveness of steel pieces physically simulates the bearing strain process, the physical and mechanical properties of the surface layer and its microstructure, and the diffusion of chemical elements by surface deformation using the chemical microanalyzer. The method and technology of running-in steel pieces of complex profile with the wedge roller and the device for the process implementation are developed. The findings are demonstrated for the adaptation of novel technology to production.

29. Dolgosheya N. O. Value of agrarian enterprises financial sustainability for innovative activity realization. Economic Annals-XXI. 2013. Vol. 1-2, Issue 1. P. 30-33. URL: https://www.scopus.com/record/display.uri?eid=2-s2.0-84900413384&origin=resultslist&sort=plf-t&src=s&nlo=&nlr=&nls=&sid=b267989a1198e89938fbb6e0b9a1d424&sot=aff&sdt=cl&cluster=scopubyr%2c"2013"%2ct&sl=56&s=AF-ID%28"Mykolayiv+National+Agrarian+University"+60108748%29&relpos=3&citeCnt=0&searchTerm=.

In the article the influence of agrarian enterprises financial sustainability on efficiency of innovative activity is considered by forming of the proper models and algorithm of financial sustainability level determination.

30. Dubinina M. V. Retrospective and trends of the institutional and structural reforms in the agrarian sector. *Eco-*

nomic Annals-XXI. 2013. Vol. 1-2, Issue 1. P. 37-40. URL: https://www.scopus.com/record/display.uri?eid=2-s2.0-84900424896&origin=resultslist&sort=plf-t&src=s&nlo=&nlr=&nls=&sid=b267989a1198e89938fbb6e0b9a1d424&sot=aff&sdt=cl&cluster=scopubyr%2c%222013%22%2ct&sl=56&s=AF-ID%28%22Mykolayiv+National+Agrarian+University%22+60108748%29&relpos=2&citeCnt=0&searchTerm=.

A retrospective study of structural and institutional reforms patterns in the agricultural sector has been conducted. It has been proved that the institutional theory better reflects the processes of the agrarian system structural transformations. The main types of the agricultural sector structural reforms has been defined.

31. Dubovenko K. V. Allowance for the interaction between the underwater electric discharge channel plasma and the shock wave reflected from the chamber's wall. Surface *Engineering and Applied Electrochemistry*. 2013. Vol. 49, Issue 1. P. 28-35. DOI: 10.3103/S1068375513010031.

The numerical simulation of a spark discharge formed along the axis of a cylindrical chamber filled with water has been carried out in the magnetohydrodynamic approximation. The simulation results are compared with the data known from the literature. The analysis of the spatiotemporal distribution of the pressure and temperature in the discharge chamber has been performed with due account for the interaction between the shock waves excited by the spark discharge and reflected from the chamber's wall and the plasma channel.

32. Electrodischarge technology and equipment to produce new carbon nanomaterials / Kuskova N. I. etc. *Surface Engineering and Applied Electrochemistry*. Vol. 49, Issue 3. P. 215-221. DOI: 10.3103/S1068375513030095.

A continuous and nonwaste process is proposed that consists

of a set of simultaneous operations concerning the electrodischarge treatment of carbon liquid in reactors through exposure to high temperatures and pressures generated by a plasma discharge channel, the selection and separation of the processed sub-stance in filtering or centrifugal separating devices, and the recirculation of the purified material in a closed hydraulic system. The product, depending on the method used for the selection and separation, is a thick pasty mass or a dry powder mixture containing various modifications of carbon: fullerenes, nanotubes, and nanodiamonds (up to 10% of the total weight). A prototype of the electric equipment has been built to provide processing performance of from 0.02 to 1.5 kg/hour. It has a maximum installed capacity of 5 kV A, and the specific energy consumption ranges from 0.1 to 10 MJ/kg. The surge-current generator with microprocessor control was designed for industrial applications. It allows achieving the maximum discharge pulse recurrence frequency of 200 Hz, which is limited by the time of the medium's relaxation and the dielectric strength's restoration in the discharge gap. This ensures the versatile regulation and a shift in the corresponding processing performance of the single-reactor systems in the range from 0.4 to 30 kg/ hour. This technology is complemented with the developed method for the enrichment of the produced ultrafine powder. It consists of an original sequence of physical and chemical methods (magnetic separation, acid treatment, chromatographic purification, etc.) and can increase the targeted selectivity of the processed products.

33. Ksyonzhik I. V. Socioeconomic problems of village youth in the context of joining the EU. *Actual Problems of Economics*. 2013. Vol. 148, Issue 10. P. 177-184. URL: https://www.scopus.com/record/display.uri?eid=2-s2.0-84923643950&origin=resultslist&sort=plf-t&src=s&nlo=&nlr=&nls=&sid=b267989a1198e89938fbb6e0b9a1d424&sot=aff&sdt=cl&cluster=scopubyr%2c%

2220133%22%2ct&sl=56&s=AF-ID%28%22Mykolayiv+National+Agrarian+University%22+60108748%29&relpos=0&citeCnt=0&searchTerm=.

The article covers the main problems of village youth life in Ukraine and carries the analysis of social infrastructure in the countryside; giving inter alia the portrait of an average young countryman and determining the key measures of social and economic improvements in the villages of Ukraine.

34. Ksyonzhyk I. V. Economic activity of rural population in Ukraine. *Actual Problems of Economics*. 2013. Vol. 150, Issue 12. P. 153-159. URL: https://www.scopus.com/record/display.uri?eid=2-s2.0-84922459635&origin=resultslist&sort=plf-t&src=s&nlo=&nlr=&nls=&sid=b267989a1198e89938fbb6e0b9a1d424&sot=aff&sdt=cl&cluster=scopubyr%2c"2013"%2ct&sl=56&s=AF-ID%28"Mykolayiv+National+Agrarian+University"+60108748%29&relpos=1&citeCnt=1&searchTerm=.

The paper analyzes the grouping of the rural population by the levels of activity and determines the indicators of employment and unemployment in rural areas, also studying the effects of education quality upon economic activity in rural inhabitants.

35. Sheptilevskiy A. V., Kosenkov V. M., Selezov I.T. Three-dimensional model of a hydroelastic system bounded by a spherical shell. *Journal of Mathematical Sciences (United States)*. 2013. Vol.190, Issue 6. P. 823-834. DOI: 10.1007/s10958-013-1291-z.

We have developed a three-dimensional model of a dynamic system composed of a spherical shell filled by compressible liquid with a gas cavity at the center. The dynamics of the shell is described by equations of motion in the Kirchhoff-Love statement, the state of the gas in the cavity is determined by the energy balance equation, and the motion of the liquid

is determined by the wave equation. The interaction between the components of the system is established with the help of contact boundary conditions. We have performed testing of the model on the base of mathematical and physical principles.

2014 рік

36. Kostyrko A. G. Components and ways to energize investment activity of agrarian sector in Ukraine. *World Applied Sciences Journal*. 2014. Vol. 30, Issue 12. Pages 1889-1891. DOI: 10.5829/idosi.wasj.2014.30.12.14240.

The article focuses on theoretic aspects of investment activity of the enterprises in agrarian sector, the dependencies between investment attractiveness and the interests of investment process participators are shown; the author shows the ways to activate investment activity of agricultural enterprises and attract investment capital into Ukraine economy.

37. Kramarenko S. S., Dovgal I. V.Spatial variation of the land snail brephulopsis cylindrica (gastropoda, pulmonata, enidae): A fractal approach. *Vestnik Zoologii*. 2014. Volume 48, Issue 5, 1. P. 435-440. DOI: 10.2478/vzoo-2014-0051.

Spatial Variation of the Land Snail Brephulopsis cylindrica (Gastropoda, Pulmonata, Enidae): a Fractal Approach. Kramarenko, S. S., Dovgal, I. V.-Th e results of investigations of intrapopulation patterns in the land snail Brephulopsis cylindrica (Menke, 1828) variation are discussed in the article. Th e self-similar intrapopulational groups (demes) with sets of random (chaotic) and ranked (clinal) patterns of morphological characters were observed. It is argued that the self-similar elements lead to the formation of spatial variability patterns with distinct fractal nature. Thus the relative roles both of the random and the regular components can be detected for separate characters according to the degrees of nearness or remoteness of fractal dimension to 2.0.

38. Litvak O. A. Environmental assessment of land resources structure in the region. *Actual Problems of Economics*. 2014. Vol. 159, Issue 9, 1. P. 287-294. URL: https://www.scopus.com/record/display.uri?eid=2-s2.0-84917742963&origin=resultslist&sort=plf-t&src=s&nlo=&nlr=&nls=&sid=4934cee5997c0efbd45888355485d9f8&sot=aff&sdt=cl&cluster=scopubyr%2c%222014%22%2ct&sl=56&s=AF-ID%28%22Mykolayiv+National+Agrarian+University%22+60108748%29&relpos=2&citeCnt=0&searchTerm=.

The article presents a comparative analysis of the optimal environmental parameters and the current structure of lands in the Mykolayiv region. An assessment of ecological stability of the territorial structure of the Mykolayiv region and sustainability of lands to anthropogenic load is provided. Key directions in the optimization of territorial land use in the Mykolayiv region are grounded.

39. Marchuk L. P. Personnel creativity management framework as an instrument of innovative transformation of production. *Actual Problems of Economics*. 2014. Vol.151, Issue 1. P. 359-367. URL: https://www.scopus.com/record/display.uri?eid=2-s2.0-84922516040&origin=resultslist&sort=plf-t&src=s&nlo=&nlr=&nls=&sid=8a1b082d4cf5ca9e2278e37fae91c48e&sot=aff&sdt=cl&cluster=scopubyr%2c%222014%22%2ct&sl=56&s=AF-ID%28%22Mykolayiv+National+Agrarian+University%22+60108748%29&relpos=0&citeCnt=1&searchTerm=.

The article considers the content and the forms of personnel creativity enhancement. The role of creative work under innovative restructuring of production is revealed. The theoretical framework and the practical aspects of personnel creativity management is defined.

40. Yakushova K. V. Systematization of eco-friendly principles of land use as a way to ensure eco-friendly product competitiveness. *Actual Problems of Economics*. 2014. Vol. 158, Issue 8, 1. P. 238-244. URL: https://www.scopus.com/record/display.uri?eid=2-s2.0-84921971040&origin=resultslist&sort=plf-t&src=s&nlo=&nlr=&nls=&sid=8a1b082d4cf5ca9e2278e37fae91c48e&sot=aff&sdt=cl&cluster=scopubyr%2c%2222014%22%2c&sl=56&s=AF-ID%28%22Mykolayiv+National+Agrarian+University%22+60108748%29&relpos=1&citeCnt=0&searchTerm=.

The article reviews the meaning of the category "principles of eco-friendly land tenure". The analysis of the existing principles of land tenure is carried out. The systematization of the ecofriendly tenure principles land is suggested.

2015 рік

41. Atamanyuk I. P., Kondratenko Y. P. Calculation method for a computer's diagnostics of cardiovascular diseases based on canonical decompositions of random sequences. *CEUR Workshop Proceedings. 11th International Conference on ICT in Education, Research and Industrial Applications: Integration, Harmonization and Knowledge Transfer, ICTERI 2015*; Lviv; Ukraine; 14-16 May 2015; Код 112160. Vol.1356. P.108-120. URL: https://www.scopus.com/record/display.uri?eid=2-s2.0-84930334325&origin=resultslist&sort=plf-t&src=s&nlo=&nlr=&nls=&sid=5145b98d03a92c20bd7409d8b64588e5&sot=aff&sdt=cl&cluster=scopubyr%2c%2222015%22%2c&sl=56&s=AF-ID%28%22Mykolayiv+National+Agrarian+University%22+60108748%29&relpos=4&citeCnt=10&searchTerm=.

The canonical decomposition of sequence describing the

change of cardiograms is put in the basis of the method for a computer system of disease diagnostics. Obtained criterion of the solution of the problem of electrocardio-grams classification is considerably simpler than the known criterion of making decision on the basis of the criterion of the maximum of density of distribution. The transition from multi-dimension density distribution to producing of uni-dimensional densities that allows to use random number of parameters of electrocardiograms for diagnostics is offered to carry out. The results of numerical experiment confirm the effectiveness of the offered method and high reliability of the processes of identification of cardiovascular diseases identification on the basis of its usage.

42. Atamanyuk I. P., Kondratenko Y. P. Computer's analysis method and reliability assessment of fault-tolerance operation of information systems. *CEUR Workshop Proceedings. 11th International Conference on ICT in Education, Research and Industrial Applications: Integration, Harmonization and Knowledge Transfer, ICTERI 2015*; Lviv; Ukraine; 14-16 May 2015; Код 112160. 2015. Vol. 1356. P. 507-522. URL: https://www.scopus.com/record/display.uri?eid=2-s2.0-84930371151&origin=resultslist&sort=plf-t&src=s&nlo=&nlr=&nls=&sid=5145b98d03a92c20bd7409d8b64588e5&sot=aff&sdt=cl&cluster=scopubyr%2c%222015%22%2ct&sl=56&s=AF-ID%28%22Mykolayiv+National+Agrarian+University%22+60108748%29&relpos=3&citeCnt=13&searchTerm=.

In this paper there was obtained an calculation method of the assess-ment of the probability of fail-safe operation of information systems in the fu-ture instants of time. The method is based on the algorithm for modeling a pos-teriori nonlinear random sequence of change of values of the controlled parame-ters which is imposed a limitation of belonging to a cer-

tain range of possible values. The probability of fail-safe operation is defined as the ratio of the num-ber of realizations that fell in the allowable range to the total number of them, formed as a result of the numerical experiment. The realization of an a posterio-ri random sequence is an additive mixture of optimal from the point of view of mean-square nonlinear estimate of the future value of the parameter analyzed and of the value of a random variable, which may not be predicted due to the stochastic nature of the parameters. The model of a posteriori random sequence is based on the Pugachev's canonical expansion. The calculation method offered does not impose any significant constraints on the class of random sequences analyzed (linearity, stationarity, Markov behavior, monotoneness, etc.).

43. Atamanyuk I., Kondratenko Y., Shebanin V., Mirgorod V. Method of polynomial predictive control of fail-safe operation of technical systems. *Proceedings of 13th International Conference: The Experience of Designing and Application of CAD Systems in Microelectronics*, CADSM 2015. P. 248-251. DOI: 10.1109/CADSM.2015.7230848.

In this paper there was obtained a method of the assessment of the probability of fail-safe operation of technical systems in the future instants of time. The method is based on the algorithm for modeling a posteriori nonlinear random sequence of change of values of the controlled parameter which is imposed a limitation of belonging to a certain range of possible values. The probability of fail-safe operations is defined as the ratio of the number of realizations that fell in the allowable range to the total number of them, formed as a result of the numerical experiment. The realization of a posteriori random sequence is an additive mixture of optimal from the point of view of mean-square nonlinear estimate of the future value of the parameter analyzed and of the value of a random variable, which can not be predicted due to the stochastic nature of the parameter. The model of a posteriori random

sequence is based on the Pugachev's canonical expansion. The method offered does not impose any significant constraints on the class of random sequences analyzed (linearity, stationarity, Markov behavior, monotoneness, etc.).

44. Groza A. D. P-polarized nonlinear surface polaritons near the surface of an epsilon-near-zero metamaterial with saturable permittivity: *Threshold cases. Nonlinear Optics Quantum Optics*. 2015. Vol. 47, Issue 4. P. 247-254. URL: https://www.scopus.com/record/display.uri?eid=2-s2.0-84950308663&origin=resultslist&sort=plf-t&src=s&nlo=&nlr=&nls=&sid=5145b98d03a92c20bd7409d8b64588e5&sot=aff&sdt=cl&cluster=scopubyr%2c%2220152%22%2ct&sl=56&s=AF-ID%28%22Mykolayiv+National+Agrarian+University%22+60108748%29&relpos=1&citeCnt=0&searchTerm=.

We study p-polarized nonlinear surface polaritons (NLSP) propagating along the interface of an epsilon-near-zero (ENZ) metamaterial with saturable nonlinearity and an optically linear ENZ medium. On the base of the exact solution of Maxwell's equations we investigate the relationship between the NLSP propagation constant and the NLSP energy flux for the systems where surface polaritons can not exist in linear approximation but can exist in nonlinear case. We show that the relationship depends considerably from the saturation level of metamaterial permittivity. The propagation constant variation is limited for the self-focusing and is unlimited for the self-defocusing case. In the both cases effect of saturation of nonlinear permittivity leads to higher values of the NLSP energy flux compared to the energy flux calculated in the frameworks of Kerr model.

45. Kramarenko O. M. The development of strategic bank lending industries in the context of globalization. *Economy of Region*. 2015. Issue 3, P. 228-241. DOI: 10.17059/2015-3-19.

It is shown that, in the context of globalization, improved credit support for strategic sectors of the economy (for example, shipbuilding) can be achieved through the creation of a banking consortium based around leasing. A dialectical method of resolution of system tasks is selected as the methodological approach. Methods used include: comparative cost analysis of the strategic lending industry supporting the formation and development of a banking consortium; integrated method at the condition modeling of making and implementation of a lease agreement, which allowed to accommodate the interests for both parties of such agreement; optimization method to select the conditions of a lease agreement; classification and analytical method to clarify the classification of lease. The study proved and developed a plan of creation a banking consortium, including options of interaction of such consortium with potential customers based on a lease agreement. The process of functioning of the lease agreement in order to optimize it for both a bank consortium-lessor and a lessee is modeled. The significant advantages of leasing compared to the traditional lending for both parties of leasing, especially when ensuring long-term projects are summarized. The results of the research can be applied in the strategic lending industries development and can reduce the level of banking risks. Applying the results of the research in the social aspect can maintain and increase the number of jobs including the banking sector. The value of the work leis in the fact that the author has developed a new approach to achive the credit support for strategic sectors of the economy through the creation of the banking consortium based around leasing, which allows to protect the interests of both parties.

46. Kramarenko S. S., Snegin E. A. Genetic structure of the continuous and ephemeral populations of the land snail Brephulopsis Cylindrica (Gastropoda; Pulmonata; Enidae). Russian Journal of Genetics: Applied Research. 2015. Vol. 5, Issue 5, 1. P. 469-478. DOI: 10.1134/ S2079059715050068.

We analyzed the genetic structure of continuous and ephemeral populations of the land snails B. cylindrica. Based on the obtained results, we conclude that small, isolated animal populations (including, urban) tend to reduce the level of genetic diversity, which arises due to the manifestation of genetic and stochastic processes (the genetic drift or founder effect). An important consequence of the latter is the relatively high rate of random changes in genotypic profiles in small populations, which leads to a significant increase in the level of genetic differentiation between them.

47. Morphometric and molecular genetic differentiation of Apis mellifem caucasica L. honey bee lines reared in sochi region / Fornara M. S. etc. Sel'skokhozyaistvennaya Biologiya. 2015. Vol. 50, Issue 6. P. 776-784. DOI: 10.15389/agrobiology.2015.6.776eng.

Creating specialized lines is one of the techniques of genetic improvement and conservation of breeds and populations of the honeybee. The aim of this study was a comparative assessment of the diversity and differentiation degree of A. m. caucasica lines based on morphometric analysis and microsatellites (MS). Material for this study was the worker bees of Gray Mountain Caucasian breed (lines I-V, n = 728) which were selected in five apiaries in the Greater Sochi of Krasnodar krai. Morphometric analysis included such measurements as the length of the proboscis (LP, mm), width of third tergite (W3T, mm) and cubital index (CI). Molecular genetic studies were based on seven MS loci (A024, A88, A113, AP043, HB-C16-05, HB-THE-03, HB-C16-01). The level of variation between families for morphometric parameters was determined by two-way hierarchical analysis of variance. Genetic differences between families for MS were estimated by paired comparison of Fst values. Fst matrix was used for PCA-analysis. To determine the quantitative estimation of variation between families within lines we calculated

Fst, Rst (AMOVA). The degree of line's differentiation for morphometric characters was evaluated by calculating the Euclidean distances. The obtained values were used to construct a dendrogram of similarity by a single bond (single linkage) of the hierarchical clustering algorithm. The differentiation of lines for MS was based on calculating the values of Nei genetic distances. Similarity dendrogram was constructed using the method of UPGMA. We performed summary statistic using the software STATISTICA, GenAlEx (v. 6.5.1), PAST (v. 3.03). Morphometric analysis showed the presence of significant differences between the lines for LP and W3T whereas there was no difference between the lines for CI. The greater heterogeneity concerning studied traits in the lines II and V was revealed, and on the contrary, there was more consolidation in the lines III and IV. Bees of line I differed significantly from the rest of the lines on both traits, but they were characterized by significant differences between families in LP. Analysis of MS profiles showed similar trends in assessing the level of intra- and interfamily variability. We observed an excess of heterozygotes in the line I (Fis = -0.048), which can be considered as an indication of the high heterogeneity. Bees of this line were characterized by a minimal individual (Fit = 0.052) and the maximal interfamily variability (Fst = 0,124). Lines II-V were characterized by a deficiency of heterozygotes (Fis = 0.062-0.128), a relatively higher individual variability (Fit = 0.143-0.189) and lower values of interfamily variability comparing to line I (Fst = 0.095-0.104). The lowest interfamily differences were observed in the lines III and IV (Fst = 0.096 and 0.095, respectively). Analysis of the differentiation of the studied lines for morphometric characteristics and MS revealed differences in the structure of the family tree. The dendrogram based on MS data is a reflection of the geographical origin of these lines. The structure of the family tree, based on morphometric characters, does not reflect the geographic closeness (differences) of origin or similarities (differences) in the economically use-

ful traits of studied lines. Thus, the results of our studies of the morphometric parameters and MS show similar trends in assessing intra- and interline variation, but there are differences in assessing differentiation of lines using two methods. In the future complex approach will allow to identify not only breeds of bees with high accuracy, but also smaller taxonomic units. It is hoped that the research results in general can be used in breeding work to restore the purity of the honeybee breeds.

48. The association of IGF2 with productive traits of pigs of large white breed in the aspect of sexual differentiation / Kostyunina O. V. etc. *Sel'skokhozyaistvennaya Biologiya*. Vol. 50, Issue 6. P. 736-745. DOI: 10.15389/agrobiology.2015.6.736eng.

Marker-assisted selection is an attractive way to improve the economically important traits in domestic animals and particularly in pigs. Insulin-like growth factor 2 (IGF2) is one of the potentially important genetic marker for growth and carcass traits of pigs. The objective of our work was to study G3072A polymorphism of IGF2 gene in different pig breeds and to evaluate the effect of boar genotypes on productive traits of their offspring of different sexes. IGF2 polymorphism was studied in seven pig breeds including large white and their close related breeds Yorkshire and Edelswine (LW, n = 1247), Landrace (L, n = 934), Duroc (D, n = 642), Pietrain (P, n = 87), Belorussian meat (BM, n = 37), Liven (LIV, n = 54), Estonian beckon (EB, n = 10), one synthetic line Body (BD, n = 138) and one terminal cross (TM, n = 66). Association studies were performed using data records of 5908 offspring (including 5015 gilts and 893 young boars) produced from twenty LW boars with known genotype for IGF2. The following productive traits were evaluated: body weight at the end of growing period (BW, kg), daily gain during entire growing period (DG, g), daily gain during early period from birth to 76.41±0.04 days (DG1, g), daily gain during late pe-

riod from 76.41±0.04 to 170.23±0.05 (DG2, g); the age at 100 kg (AGE100kg, days), average actual back fat thickness measured in four points at the end of growing period (BF, mm) and average back fat thickness calculated for the 100 kg body weight (BF100kg, mm). Significantly higher frequencies of the potentially «desired» A allele and AA genotype were observed in BD (0.986 and 0.971, respectively), TM (0.977 and 0.955), P (0.966 and 0.931) and D (0.960 and 0.921). LW pigs were characterized by the intermediate values of allele A (0.664) and genotype AA frequencies (0.532). In EB, BM and L the frequencies of A allele and AA genotype varied from 0.250 to 0.363 and from 0.100 to 0.243, respectively. We did not identify A allele in local Russian LIV pig breed. Association studies showed high-significant tendency to increase of BW, DG1, DG2, DG, BF and BF100kg values and to decrease of AGEiookg values of both gilts and boars at the order of genotypes GG→ AG→ AA. Calculations performed with additive-dominance model and two-way analysis of variance (ANOVA) showed the faster increasing (decreasing) above-mentioned traits in order of genotypes GG → AG → AA in young boars comparing to gilts. Principal component (PC) analysis showed that first two PCs (PC1 and PC2) determine 76.23 % of variability of the initial matrix for young boars and 82.49 % for gilts. PC1 is highly associated with daily gains during the late growing period (for DG2: r = 0.501 for young boars and 0.896 for gilts) and for the entire growing period (for DG: r = 0.923 and 0.929), whereas PC2 is associated with the daily gains during early growing period (for DG1: r = -0.709 and -0.769). The additive (A) and dominant (D) components of the variability and effects of allele substitution calculated for PC1 were similar for both sexes: A = 0.290, p > 0.001; D = -0.064 - in gilts and A = 0.351, p > 0.001; D = 0.040 - in young boars. We received significant values for PC2 in young boars only for dominant component (A = 0.085; D = 0.177, p < 0.05), whereas in gilts it was only for additive component (A = 0.094, p > 0.001; D

= -0.031). The quantitative effects of IGF2 genotypes growing performance on the growth and carcass traits of pigs, and sex-dependent effect of marker genotypes on growing performance of pigs among growing periods should be taken in a point for development of programs of markerassisted selection utilizing IGF2.

49. Vinarski M. V., Kramarenko S. S. How does the discrepancies among taxonomists affect macroecological patterns? *A case study of freshwater snails of Western Siberia. Biodiversity and Conservation*. 2015. Vol. 24, Issue 8, 27. P. 2079-2091. DOI: 10.1007/s10531-015-0934-4.

From the point of view of biogeographers and ecologists, taxonomy is not only a means of ordering life but also a source of some problems able to impede the progress in studies of large-scale patterns of biological diversity. Discrepancies among systematists caused, inter alia, by their different views on the species concept and criteria for species delineation, are commonly thought to provoke errors and misinterpretations in macroecological inferences. In this study, we discuss a case of freshwater gastropods of Western Siberia. Two systematic frameworks, developed in Western Europe and Russia and drastically different in number of accepted genera and species, were proposed to classify the Palearctic aquatic snails. Having compared two sets of diversity data generated on the basis of the two systematic frameworks, we found that their parameters do not differ significantly. Such patterns as latitudinal gradients in total species richness, portion of branchiate snail species, and portion of species of non-European origin proved to remain the same, irrespective of which taxonomic approach, Western European, or Russian, is accepted. The absence of reliable changes in macroecological patterns may be explained by nearly consistent "splitting effort" applied by the Russian taxonomists in their revision of different families of aquatic snails. Thus, though the European and the Russian systematic frameworks differ significantly in number of accepted species, the large-scale patterns

of diversity based on the two approaches are qualitatively the same.

50. Zhorova A. N., Kozlova L. G., Mulenko I. A., Homkin A. L. Virial coefficients for thermodynamic systems with hill pseudopotential. *Journal of Nano- and Electronic Physics*. 2015. Vol. 7, Issue 1. Номер статьи 01037. URL: https://www.scopus.com/record/display.uri?eid=2-s2.0-84927136264&origin=resultslist&sort=plf-t&src=s&nlo=&nlr=&nls=&sid=5145b98d03a92c20bd7409d8b64588e5&sot=aff&sdt=cl&cluster=scopubyr%2c%2222015%22%2c&sl=56&s=AF-ID%28%22Mykolayiv+National+Agrarian+University%22+60108748%29&relpos=6&citeCnt=0&searchTerm=.

Temperature dependences of the 2-nd, 3-d and 4-th virial coefficients for chemically aggressive environments are analyzed. Their calculation is performed for several different pair interaction potentials and built on them Hill pseudopotentials. Use of a pair Hill pseudopotential, limiting the scope of the phase space available for the classical motion of free particles, allows to extend the domain of convergence of the virial temperature of decomposition.

2016 рік

51. Atamanyuk I. P., Kondratenko Y. P., Shebanin V. S. Calculation methods of the prognostication of the computer systems state under different level of information uncertainty. *CEUR Workshop Proceedings*. Vol.1614. P. 292-307. URL: https://www.scopus.com/record/display.uri?eid=2-s2.0-84977570336&origin=resultslist&sort=plf-t&src=s&nlo=&nlr=&nls=&sid=b4e7915c6f2853cf0fca4a0681359ea8&sot=aff&sdt=cl&cluster=scopubyr%2c%2222016%22%2c&sl=56&s=AF-ID%28%22Mykolayiv+National+Agrarian+University%22+60108748%29&relpos=7&citeCnt=0&searchTerm=.

Calculation methods of the prognostication of the computer systems state under different volume of a priori information and accuracy of the measurement of controlled parameters (under absence and presence of measurement errors) are obtained in the work. Canonical expansions of random sequences of the indices characterizing the state of the investigated systems considered as basic features of the methods. Synthesized methods do not impose any significant limitations on the qualities of the sequence of the change of the forecast parameters (linearity, stationarity, Markov behavior, monotoneness, etc.) and allow to take into account the stochastic peculiarities of the process of functioning of the investigated objects as much as possible. Expressions of the determination of a mean-square extrapolation error are obtained for solving the prognostication problems specifically concerning the state of computer systems under different level of information uncertainty.

52. Atamanyuk I. P., Kondratenko Y. P., Sirenko N. N. Forecasting economic indices of agricultural enterprises based on vector polynomial canonical expansion of random sequences. *CEUR Workshop Proceedings.* 2016. Vol.1614. P. 458-468. URL: https://www.scopus.com/record/display.uri?eid=2-s2.0-84977549620&origin=resultslist&sort=plf-t&src=s&nlo=&nlr=&nls=&sid=b4e7915c6f2853cf0fca4a0681359ea8&sot=aff&sdt=cl&cluster=scopubyr%2c%222016%22%2ct&sl=56&s=AF-ID%28%22Mykolayiv+National+Agrarian+University%22+60108748%29&relpos=8&citeCnt=4&searchTerm=.

Calculating method for forecasting economic indices of agricultural enterprises on the basis of vector polynomial exponential algorithm of extrapolation of the realizations of random sequences is worked out. The model of prognosis allows estimate the results of enterprise functioning (to estimate fu-

ture gross profit, gross production) after its reorganization (change of land resources, manpower resources, fixed assets). Prognostic model does not impose any restrictions on the forecast random sequence (linearity, stationarity, Markov behavior, monotonicity, etc.) and thus allows fully take into consideration stochastic peculiarities of functioning of agricultural enterprises. The simulation results confirm high efficiency of introduced calculating method. The scheme reflecting the peculiarities of functioning of the forecast model are also introduced in the work. The method can be realized in the decision support systems for agricultural and non-agricultural enterprises with various sets of economic indices.

53. Atamanyuk I. P., Kondratenko Yu. P. Method of generating realizations of random sequence with the specified characteristics based on nonlinear canonical decomposition. *Journal of Automation and Information Sciences*. 2016. Vol. 48, Issue 10. P. 31-48. DOI: 10.1615/JAutomatInfScien.v48.i10.40.

An important scientific and technical problem of forming the method of generating realizations of random sequences for arbitrary number of sampling points and the order of nonlinear stochastic links has been considered. The proposed method of generation, as well as the nonlinear canonical decomposition technique, on the basis of which the method is obtained, do not impose any essential limitations on the class of the studied random sequences (linearity, Markovian property, stationarity, monotony etc.). An approach for determination of optimal parameters of nonlinear canonical model: The number of sampling points, order of stochastic links, modeling interval, is offered. The block diagrams of the algorithms of the obtained method functioning are presented. The results of numeral experiment on computer have confirmed the high efficiency of the developed method of generation.

54. Burkovska A. V., Lunkina T. I., Korabakhina A.Y. Fiscal decentralization influence on socioeconomic development of Ukraine's Regions. *Actual Problems of Economics*. 2016. Vol.185, Issue 11. P. 230-237. URL: https://www.scopus.com/record/display.uri?eid=2-s2.0-84995931624&origin=resultslist&sort=plf-t&src=s&nlo=&nlr=&nls=&sid=b4e7915c6f2853cf0fca4a0681359ea8&sot=aff&sdt=cl&cluster=scopubyr%2c%222016%22%2ct&sl=56&s=AF-ID%28%22Mykolayiv+National+Agrarian+University%22+60108748%29&relpos=0&citeCnt=0&searchTerm=.

The article discusses the formation and development prospects of capable communities in terms of budget and tax reforms. The main sources of fiscal incentives for unification are determined. The key features of financial incentives of united communities by reforming the tax system are presented. The influence of decentralization on socioeconomic development of Ukraine's regions is explained.

55. Development of qualimetric approaches to the processes of quality management system at enterprises according to international standards of the ISO 9000 series / Trisch R. etc. *Eastern-European Journal of Enterprise Technologies*. 2016. Vol. 4, Issue 3-82. P. 18-24. DOI: 10.15587/1729-4061.2016.75503.

For the assessment of the processes of the system of quality management (QMS) at enterprises, it is necessary to bring all estimations of the indicators of quality of the processes to one, desirably a dimensionless, scale of measurements. As the function of desirability for the conversion of various dimensional indicators of quality into a dimensionless value, applying a desirability function is proposed. A peculiarity and a difference from the existing functions of desirability is the fact that it takes into account maximally permissible and minimally permissible values of the indicator of quality of a process, and also its best (optimal) value. In addition to this, the

parameter of form and steepness of function is present, which will make it possible to use them for the assessment of the processes of different significance with different requirements for quality. It is proposed to assess QMS through the values of the set of interconnected processes, i. e., to combine the assessments of different processes into one set of data and to estimate this set as a whole. This procedure will make it possible to increase the amount of information about the estimations of quality of the system as a set of processes, which will allow assessing the system as a whole with higher objectivity and reliability. The solution to this problem is proposed by statistical methods, using parametric and nonparametric statistics, since they do not require the knowledge of the law of distribution of a random value.

56. Havrysh V. I., Nitsenko V. S. Current state of world alternative motor fuels market. Actual Problems of Economics. 2016. Vol. 181, Issue 7, P. 41-52. URL: https://www.scopus.com/record/display.uri?eid=2-s2.0-84978732051&origin=resultslist&sort=plf-t&src=s&nlo=&nlr=&nls=&sid=b4e7915c6f2853cf0fca4a0681359ea8&sot=aff&sdt=cl&cluster=scopubyr%2c%222016%22%2ct&sl=56&s=AF-ID%28%22Mykolayiv+National+Agrarian+University%22+60108748%29&relpos=5&citeCnt=1&searchTerm=.

The relationship between social formations and energy resources consumption, key world trend of the motor fuels market have been explored. Economic factors that affect production and use of alternative motor fuels are studied. National features of the alternative fuels market are outlined.

57. Kalinichenko A., Havrysh V., Perebyynis V. Evaluation of biogas production and usage potential. *Ecological Chemistry and Engineering S*. 2016. Vol. 23, Issue 3. P. 387-400. DOI: 10.1515/eces-2016-0027.

The aim of the research is the development of theoretical and methodical bases for determining the feasibility of plant raw materials growing for its further bioconversion into energy resources and technological materials to maximize profit from business activities. Monograph, statistics, modelling and abstract logical methods have been used during the research. Directions of biogas usage have been examined. Biogas yields from different crops have been analyzed. It has been determined that high methane yields can be provided from root crops, grain crops, and several green forage plants. So, forage beet and maize can provide more than 5,500 m3 of biogas per hectare. Attention is paid to the use of by-products of biogas plants, especially carbon dioxide. Carbon dioxide is an important commodity and can increase profitability of biogas plant operating. It can be used for different purposes (food industry, chemical industry, medicine, fumigation, etc). The most important parameters of the biogas upgrading technologies have been analyzed. If output of an upgrade module is more than 500 nm3/h, investment costs of different available technologies are almost equal. According to experts, it is economically feasible to use anaerobic digestion biogas systems to upgrade biomethane provided their performance is equivalent to 3,000 litres of diesel fuel per day. The economic and mathematical models have been suggested to determine the feasibility of growing plant materials to maximize the gross profit. The target function is the maximum gross income from biogas utilization. It has the following limitations: annual production of biogas, consumption of electricity, heat and motor fuels. The mathematical model takes into account both meeting own requirement and selling surplus energy resources and co-products including carbon dioxide. In case of diesel fuel substitution, an ignition dose of diesel fuels has been considered. The algorithm for making a decision on construction of a biogas plant has been offered.

58. Nitsenko V.S., Havrysh V. I. Enhancing the stability of

a vertically integrated agroindustrial companies under uncertainty. *Actual Problems of Economics*. 2016. Vol. 184, Issue 10. P. 167-172. URL: https://www.scopus.com/record/display.uri?eid=2-s2.0-84992536263&origin=resultslist&sort=plf-t&src=s&nlo=&nlr=&nls=&sid=b4e7915c6f2853cf0fca4a0681359ea8&sot=aff&sdt=cl&cluster=scopubyr%2c"2016"%2ct&sl=56&s=AF-ID%28"Mykolayiv+National+Agrarian+University"+60108748%29&relpos=4&citeCnt=0&searchTerm=.

The paper presents an analysis of the main provisions of uncertainty and its relation to the category of risk. On the basis of empirical research major uncertainties and risks, and their impact on agricultural enterprises, processing plants and vertically integrated structures are defined.

59. Poisa L., Bumane S., Cubars E., Antipova L. Hemp quality parameters for bioenergy-impact of nitrogen fertilization. *Engineering for Rural Development*. 2016. Vol. 2016-January. P. 928-933. URL: https://www.scopus.com/record/display.uri?eid=2-s2.0-84976559810&origin=resultslist&sort=plf-t&src=s&nlo=&nlr=&nls=&sid=b4e7915c6f2853cf0fca4a0681359ea8&sot=aff&sdt=cl&cluster=scopubyr%2c%222016%22%2ct&sl=56&s=AF-ID%28%22Mykolayiv+National+Agrarian+University%22+60108748%29&relpos=9&citeCnt=0&searchTerm=.

The aim of the research - to evaluate the nitrogen fertilizer rate impact on the energetic parameters of hemp. The nitrogen fertilizer rate effect on the hemp ash content depends on the hemp variety: for the local variety "Purini", with the increase of the nitrogen fertilizer rate, the ash content decreases, while for the variety "Bialobrzskie" - it is the opposite - increasing the nitrogen fertilizer rate, the ash content increases. Change of the nitrogen fertilizer rate from N0 to

N100 increased the resulting thermal capacity from one hectare. In this research it was observed that a higher thermal capacity has a positive ($p < 0.001$) connection with the harvest yield amount. For the sown hemp the nitrogen rate variation increased the thermal energy amount from one hectare for shives by 73 % ("Pūriņi") and 31 % ("Bialobrzskie"), for the stalks by 66 % ("Pūriņi") and 36 % ("Bialobrzskie"). The highest determined thermal capacity for hemp was 171.71 ± 18.31 GJ·ha-1.

60. Poltorak A., Volosyuk Y. Tax risks estimation in the system of enterprises economic security. Economic Annals-XXI. 2016. Vol. 158, Issue 3-4, 21. P. 35-38. DOI: 10.21003/ea.V158-08.

One of the aspects which characterises the quality and reasonableness of managerial decisions at the enterprises is the determination of their positions concerning the complex of risks in the field of entrepreneurship, including tax risks. In conditions of fast reforming of the Ukrainian taxation system and the valid legislative and regulatory framework, the potential for errors in the process of determination of tax bases and the incorrect definition of certain legislative standards increases. It contributes to the appearance of tax risks and acuminates the problem of their estimation in the system of economic security of enterprises. Purpose. The purpose of the research is to analyse the specificity of tax risks, which makes it possible to single out this type of business risks into a separate group; generalise the major forms of tax risks with regard to business manifestations in the system of economic security of enterprises; estimate methods of calculation of indices relevant to the assessment of tax burden; introduce an algorithm of tax risk assessment regarding the schedule of planned audit at the enterprises. Results. The article deals with the analysis of the term "tax risk of an enterprise", as well as its definition suggested by the authors. In this case, the term "tax risk of an enterprise" should be understood as

the probability of changes in the financial position of an entity because of the impact of internal and external factors of an objective and subjective character on the system of tax planning of an enterprise. The authors have analysed the unique features of the tax risks, which makes it possible to single them out into a separate group of business risks, characterized by the deferment of realisation of tax risks applied to the decision-making process in the system of taxation; attribution of tax risks to the category of "pure risks"; the dual influence of tax risks which are not only a financial but also legislative category. The major forms of tax risks in the system of economic security include the discordance of decisions in the field of taxation to the requirements of current legislation; improper storage and processing of primary documentation; violation of terms of tax payment and application for regulatory authorities; technical errors in the process of taxing and accounting. Conclusion. The authors have offered a four-index calculation method in the field of assessment of tax burden, including the specific size of taxes in the structure of gross incomes, pure incomes, pure current assets and financial results before the taxation for the purpose of detection of certain problems in the field of taxation and major tax risks of an enterprise. The algorithm of tax risk assessment relevant to the schedule of planned audit at the enterprises and application of the legally approved procedure of forming a plan-schedule of inspections has been introduced.

61. Population structure and genome characterization of local pig breeds in Russia, Belorussia, Kazakhstan and Ukraine / Traspov A. etc. *Genetics Selection Evolution*. 2016. Vol. 48, Issue 1, 1. Номер статьи 196. DOI: 10.1186/s12711-016-0196-y.

It is generally accepted that domestication of pigs took place in multiple locations across Eurasia; the breeds that originated in Europe and Asia have been well studied. However,

the genetic structure of pig breeds from Russia, Belorussia, Kazakhstan and Ukraine, which represent large geographical areas and diverse climatic zones in Eurasia, remains largely unknown. Results: This study provides the first genomic survey of 170 pigs representing 13 breeds from Russia, Belorussia, Kazakhstan and Ukraine; 288 pigs from six Chinese and seven European breeds were also included for comparison. Our findings show that the 13 novel breeds tested derived mainly from European pigs through the complex admixture of Large White, Landrace, Duroc, Hampshire and other breeds, and that they display no geographic structure based on genetic distance. We also found a considerable Asian contribution to the miniature Siberian pigs (Minisib breed) from Russia. Apart from the Minisib, Urzhum, Ukrainian Spotted Steppe and Ukrainian White Steppe breeds, which may have undergone intensive inbreeding, the breeds included in this study showed relatively high genetic diversity and low levels of homozygosity compared to the Chinese indigenous pig breeds. Conclusions: This study provides the first genomic overview of the population structure and genetic diversity of 13 representative pig breeds from Russia, Belorussia, Kazakhstan and Ukraine; this information will be useful for the preservation and management of these breeds.

62. Shebanin V., Atamanyuk I., Kondratenko Y. Simulation of vector random sequences based on polynomial degree canonical decomposition. *Eastern-European Journal of Enterprise Technologies*. 2016. Vol. 5, Issue 4-83. P. 4-12. DOI: 10.15587/1729-4061.2016.80786.

We propose a mathematical model and the method for generating realizations of vector random sequencesbased on the apparatus for canonical expansions of V. S. Pugachev. The developed method, in contrast to those existing, makes it possible to takefull accountof nonlinear stochastic connections and does not set any substantial constraints on the properties of the examined random sequence (scalarity, Markovian be-

havior, monotony, stationarity, ergodicity, etc.).Taking into account the recurrent nature of determiningthe parameters of the method, its realization is rather simple and it ispossible to achieve arbitrary accuracy of representation of the examined sequence that depends only on the capacities of PC. The work also presents block diagrams of the algorithms, which reflect peculiarities of the functioning of the obtained method. Results of the numerical experiment confirm the increase in the accuracy of the developed method for generating realizations of random sequences by 2,0-8,5 %. The proposed methodmay be used for solving a wide circle of applied problems, connected toexamining the objects with randomly changing conditions of functioning.

63. Shebanin V., Atamanyuk I., Kondratenko Y., Volosyuk Y. Application of fuzzy predicates and quantifiers by matrix presentation in informational resources modeling. *Perspective Technologies and Methods in MEMS Design, MEMSTECH 2016.* Proceedings of 12th International Conference 7 July 2016, Номер статьи 7507536, P.146-149.

The techniques of informational resource structuring mathematic formalization, the process on information structuring phases and the questions of fuzzy logic application at the phase of informational resources modeling are presented. The fuzzy predicates' logic in vector-matrix presentation application through fuzzy output receiving based on the rules articulated as the ratios between predicates is examined.

64. Study of the allele pool and the degree of genetic introgression of semi-domesticated and wild populations of reindeer (Rangifer tarandus L., 1758) using microsatellites / Kharzinova V. R. etc. Sel'skokhozyaistvennaya Biologiya. 2016. Vol. 51, Issue 6. P. 811-823. DOI: 10.15389/agrobiology.2016.6.811eng.

The coexistance of domestic and wild reindeer populations (Rangifer tarandus L., 1758) - is an important feature of this species. Both forms inhabit in conditions, which remain substantially unchanged for a long time. Due to gene flow between domestic and wild populations we observe a relatively high amount of admixture in the gene pool. Biodiversity characteristics of two most numerous reindeer populations (semi-domesticated Nenets breed and wild population of reindeer inhabiting territories of Nenets Autonomous Okrug (NAO) and Taimyr Autonomous Okrug (TAO) based on the analysis of microsatellites are given and the degree of introgression in these populations is determined. Samples of Nenets breed of domestic rein deer were collected in several farms in NAO and TAO (n = 115, four subpopulations). Samples of wild Taimyr population were collected in the course of field research in different geographic regions of TAO (n = 63, five subpopulations). Genomic DNA was isolated using Nexttec columns («Nexttec Biotechnologie GmbH», Germany). Polymorphism of 9 STR-loci (NVHRT21, NVHRT24, NVHRT76, RT1, RT6, RT7, RT9, RT27, RT30) was determined according to the previously developed technique for DNA analyzer ABI3130xl («Applied Biosystems», US). To estimate the allele pool of each population average number of alleles (Na), the effective number of alleles (Ne) based on the locus, rarified allelic richness (Ar), private allelic richness (PrAr), observed (Ho) and expected (He) heterozygosity and inbreeding coefficient (FIS) were calculated. The degree of genetic differentiation of populations was assessed using pairwise FST values and Nei's genetic distances. We calculated the degree of migration of genes between populations based on microsatellite allele frequencies. Distribution of genetic variation between and within populations was studied by analysis of molecular variance (AMOVA). It was found that the wild population of reindeer is characterized by a higher level of genetic diversity: the average number of alleles per locus was 10.00±0.78 vs. 8.44±0.80, the observed heterozygosity - 0.633±0.060 vs. 0.589±0.049. STRUCTURE analysis revealed the formation

of two independent clusters corresponding to the wild and domestic populations with high values of the membership coefficient in own clusters: QWLD = 0.940±0.013 and QDOM = 0.938±0.010. However, a few individuals (4.4-4.8 %) carrying a mixed genetic origin were found. The degree of introgression between the populations was around 6 %. Cluster analysis of genetic structure performed separately for wild and domestic populations at the level of subpopulations for the number of cluster k ranged from 2 to 5 did not reveal a clear clustering between subpopulation. It's confirmed the homogeneity of genetic structure within populations. Examination of overall genetic diversity with AMOVA procedure indicated that most of the variation was observed within populations (95.4 %, p < 0.001). Principal component analysis (PCA) revealed clear differentiation of the studied domestic and wild populations along the axis 1 with their slight overlapping; herewith the principal component 1 was responsible for 5.15 % of variability. Evaluation of differentiation degree between subpopulations of rein deer, performed by calculation of the pairwise values of FST and Nei's genetic distances (DN) showed relatively higher degree of genetic differentiation between subpopulations within wild population comparing to domestic population (maximal FST and DN values were 0.046 vs 0.023 and 0.353 vs 0.151, respectively). The obtained results of genetic diversity and population structure of reindeer will be used to develop the breeding program with Nenets breed of domestic rein deer and to organize the measures for protection and sustainable use of wild reindeer bioresources.

65. The study of nanoparticles of magnitite of the lipid-magnetite suspensions by methods of photometry and electronic microscopy / Alexandrov A. etc. Eastern-European Journal of Enterprise Technologies. 2016. Vol. 4, Issue 11-82. P. 51-61. DOI: 10.15587/1729-4061.2016.76105.

With the aid of the methods of photometry and electronic microscopy, we studied the sedimentation and aggregative stability of the lipid-magnetite suspensions (LMS). Different LMS were obtained. All suspensions are sufficiently stable over time. The best results in stability were displayed by suspensions, in which the ratio Fe3O4:SAS=0,02:0,35 g or 0,04 mass %:0,70 mass % and 0,025:0,35 g or 0,05 mass %:0,70 mass %. We determined size of the particles of magnetite with SAS. The order of mean particle size is defined - it amounts to < d > ~76 nm. It was found that in the course of time (0-48,0 h) and with an increase in the wavelength (210-1000 nm), a gradual increase in the coefficient of transmission is observed from 25 % (210 nm) to 71,9 % (1000 nm) at 0 hours of exposure of the suspension: from 27,5 % (210 nm) to 81,2 % (1000 nm) at the maximum period of exposure of the suspension (48 hours). The indices of LMS are determined: concentration of the particles - N=1,43 1012 cm-3, in 48 hours the concentration decreased by 20 % (N=1,19·1012 cm-3); r=38 nm, n=1,48, k=0,01. The distribution function of the particles by size is rather narrow and symmetrical, which indicates that the system of the synthesized nanoparticles is homogenous with a low degree of polydispersity. The UV spectra of LMS and their components were taken and analyzed. The comparison of the spectra of transmission of suspensions with different degree of dilution testifies to chemical identity of the samples. The kinetic dependences of the coefficient of transmission for the suspensions with different concentration of magnetite (Fe(ov.).), were examined, based on which we calculated the effective mean radius of the particles of the stabilized magnetite: 76-168 nm. The mean radius of the particles in the lipid suspension of magnetite without stabilizer (reff) =400 nm. Visually, LMS manifested high aggregation stability at the total time of sedimentation reaching several tens of hours. It was established that LMS can be used as the biologically- active and food supplements, which possess the comprehensive action: beneficial biological effect on the hu-

man organism; due to the presence of bivalent iron in magnetite and capacity to form transition complexes with oxygen and peroxide radicals (and hydroperoxides), they manifest antioxidant activity, which leads to improvement in the quality and lengthening of the period of storage of the products that contain fat. Furthermore, LMS due to Fe2+ of magnetite can be recommended as the source of easily assimilated iron and as the anti-anemic means. Therefore, the introduction of LMS to the food products increases its quality, nutritional and biological value.

2017 рік

66. Baranovsky V. M., Skalsky O. J., Pankiv M. R., Pastushenko A. S. Chicory root crops combined harvester. *INMATEH - Agricultural Engineering*. 2017. Vol. 53, Issue 3. P. 41-50.

The stages of improvement, structure and modes of digging tools of root harvesters' transport-technology systems have been described in this paper. The main ways of improvement, development principles and construction algorithm of combined digging machine for chicory root crops harvesting have been considered on the basis of research objects identification (conventional types of diggers). It was found that the construction algorithm of chicory roots combined harvester functional design must be based on mono block technological-transport systems development where digging tools are supposed to perform related technological operations simultaneously, namely: preliminary and final root crops digging, their topping. The results of experimental researches, the regression equation describing the change in loss and damage chicory root crops depending on the parameters of the combined digger are presented. It is established that the condition providing generalized criteria (root crop loss less than 2.5%, root crop damage less than 15%) performed digger combined velocity of 1.5 m/s, rotational

speed of the drive shaft 500 Rpm and depth of the ripper 16 cm.

67. Bilan Y., Nitsenko V., Havrysh V.Energy aspect of vertical integration in agriculture. [Aspekt energetyczny intergracji wertykalnej w rolnictwie]. *Rynek Energii*. 2017. Vol. 132, Issue 5. P. 98-110. URL: https://www.scopus.com/record/display.uri?eid=2-s2.0-85061365938&origin=resultslist&sort=plf-t&src=s&nlo=&nlr=&nls=&sid=0cdfb95e8d6ef547227349d74d621cba&sot=aff&sdt=cl&cluster=scopubyr%2c%222017%22%2ct&sl=56&s=AF-ID%28%22Mykolayiv+National+Agrarian+University%22+60108748%29&relpos=1&citeCnt=1&searchTerm=.

The paper investigates the state of energy aspects of agricultural integrated companies. The study proved that the integration in the agricultural and industrial complex should be viewed more broadly including bioenergy production. The scheme of relationships within vertical integration has been developed. The comparative efficiency of vertically integrated and non-integrated companies has been examined. Farms and agro-food processing facility strive to reduce energy dependence. On the basis of researches, a new scientific definition has been suggested: an agro-energy company or the agro-energy vertical. For the agro-energy company, the ways of vertical and horizontal integration building have been considered. The authors' vision of the feasibility of alternative fuel production has been presented. Efficiency of biogas production and its utilization (including by-product) has been calculated. It has been proved that the use of by-products increases the profitability of biofuel production.

68. Chornyy S., Poliashenko N. Determination of soil-loss tolerance for chernozem of Right-Bank Ukraine. *Soil Science Working for a Living: Applications of Soil Science to Present-Day Problems*. 2017. P. 109-119. DOI:

10.1007/978-3-319-45417-7_9.

Soil loss tolerance (T-value) is the maximum rate of soil erosion that may be tolerated and still allow high, sustainable crop yields. For modelling soil loss tolerance for Chernozem of the Right-Bank Steppe of Ukraine, a modified productivity index (MPI) is developed by summing productivity values of each 10 cm layer over the upper metre thickness of the soil. Productivity values depend on the content of humus, available phosphorus and potassium, bulk density, and pH. The equation is defined by the size of change in MPI over a given time and, also, the rate of decline of MPI in the topsoil caused by soil erosion. Calculations for eroded and not-eroded Ordinary chernozem and Southern chernozem under the condition of losing not more than 5% of soil fertility over 100 years indicate a soil loss tolerance of 5-7 t/ha/year.

69. Gamajunova V. Sustainability of soil fertility in the Southern Steppe of Ukraine, depending on fertilizers and irrigation. *Soil Science Working for a Living: Applications of Soil Science to Present-Day Problems*. 2017. P. 159-166.

Farming in the Southern Steppe of Ukraine is mining humus and nutrients. There comes a point when soil degradation is irreversible: sustainability requires complying with the fundamental laws of agriculture-in particular, sound crop rotation and return of nutrients to balance removal by the crops. Short- and long-term field experiments on typical Kastanozen and Chernozem reveal that provision of adequate nutrients and water gives consistently high crop yields and these factors significantly change the main indicators of soil fertility: humus content, gross and moving content of NPK, and water-physical properties (as well as the content of arsenic and heavy metals). Combined use of organic and mineral fertilizers is the most effective way to stabilize crop yields and soil fertility; organic fertilizers stabilize soil structure which, in turn, enhances the infiltration of rainfall.

Combined organic-mineral fertilizer in crop rotation increases the efficiency of water utilization on average by 20-30%, in very dry years by 30-40%.

70. Kalinichenko A., Havrysh V., Perebyynis V. Sensitivity analysis in investment project of biogas plant. *Applied Ecology and Environmental Research*. 2017. Vol.15, Issue 4. P. 969-985. DOI: 10.15666/aeer/1504_969985.

The article shows the practical value of biogas as the second generation biofuel. All the projects dealing with biogas are subjected to external risks, such as the change of market condition, customer needs, governmental regulation, etc. In conditions of uncertainty it is necessary for administration to concentrate on decision-making. Fluctuations of sales volume, energy resources and raw material prices, etc. should be taken into account. Sensitivity analysis can predict the result of negative external phenomena. We developed the economic-mathematical model for the analysis of biogas complexes sensitivity. The profitability index as a criterion for the effectiveness of investment projects is a special feature in this model. The calculations show that biogas optimal distribution provides much larger gross income. We also suggested the methodology for sensitivity analysis implementation in investment projects for biogas complex creation. According to our calculations, the most stable project has utilization both biomethane (as motor fuel) and carbon dioxide. We demonstrate that the use of the profitability index as a criterion for an investment project gives higher critical values of input external factors, that endows assured profitability of an investment project.

71. Methods of competitiveness assessment of agricultural enterprise in Eastern Europe / Dovgal O. V. etc. *Regional Science Inquiry*. 2017. Vol. 9, Issue 2. P. 231-242. URL: https://www.scopus.com/record/display.uri?eid=2-s2.0-85035339130&origin=resultslist&sort=plf-

t&src=s&nlo=&nlr=&nls=&sid=0cdfb95e8d6ef547227349d74d621cba&sot=aff&sdt=cl&cluster=scopubyr%2c%222017%22%2ct&sl=56&s=AF-ID%28%22Mykolayiv+National+Agrarian+University%22+60108748%29&relpos=10&citeCnt=4&searchTerm=.

The purpose of the article is to substantiate theoretical and methodological principles and to develop practical recommendations for the formation of competitive advantages of agroindustrial enterprises based on the methods of factor analysis. The article highlights the theoretical principles of formation of competitive advantages in agro-industrial enterprises. The article forms the methodological approaches to managing the competitiveness of agroindustrial enterprises. The organizational and economic measures on increase of competitive advantages of the enterprises of the agro-industrial complex are substantiated. The results of the study allow making more substantiated conclusions about the competitiveness state of economic entities as well as facilitating the adoption of managerial decisions on improving certain areas of activity of the agro-industrial enterprise.

72. Reconstructed historical distribution and phylogeography unravels non-steppic origin of Caucasotachea vindobonensis (Gastropoda: Helicidae) / Kajtoch Ł. etc. *Organisms Diversity and Evolution*. 2017. Vol. 17, Issue 3, P. 679-692. DOI: 10.1007/s13127-017-0337-3.

Existing data on the phylogeography of European taxa of steppic provenance suggests that species were widely distributed during glacial periods but underwent range contraction and fragmentation during interglacials into "warm-stage refugia." Among the steppe-related invertebrates that have been examined, the majority has been insects, but data on the phylogeography of snails is wholly missing. To begin to fill this gap, phylogeographic and niche modeling studies on the presumed steppic snail Caucasotachea vindobonensis

were conducted. Surprisingly, reconstruction of ancestral areas suggests that extant C. vindobonensis probably originated in the Balkans and survived there during the Late Pleistocene glaciations, with a more recent colonization of the Carpatho-Pannonian and the Ponto-Caspian regions. In the Holocene, C. vindobonensis colonized between the Sudetes and the Carpathians to the north, where its recent and current distribution may have been facilitated by anthropogenic translocations. Together, these data suggest a possible non-steppic origin of C. vindobonensis. Further investigation may reveal the extent to which the steppic snail assemblages consist partly of Holocene newcomers.

73. Shebanin V., Atamanyuk I., Kondratenko Y., Volosyuk Y. Canonical mathematical model and information technology for cardio-vascular diseases diagnostics. *14th International Conference: The Experience of Designing and Application of CAD Systems in Microelectronics, CADSM 2017*; Lviv - Polyana; Ukraine; 21-25 February 2017; Номер категории CFP17508-PRT; Код 127551. P. 438-440. DOI: 10.1109/CADSM.2017.7916170.

This paper is devoted to the development of mathematical model and information technology for computer analysis of medical diseases based on investigations of cardiograms. Authors propose to use cardiogram recognition algorithm which is synthesized on the mathematical base of nonlinear canonical decomposition of random sequence. The automation process of cardiograms recognition, analysis, classification and decision-making is described in details for the diagnosis of cardio-vascular diseases. The proposed approach can be applied in medical hospitals and clinics for increasing efficiency of medical diagnostics, including decreasing time and rising accuracy of information processing.

74. Sheptilevski O.V., Selezov I. Vol. Stress State of a Partially Fixed Spherical Shell Filled with Liquid and Sub-

jected to Impulsive. *Excitation Journal of Mathematical Sciences (United States)*. 2017. Vol. 226, Issue 1. P. 79-87.

We study the stress-strain state of a closed elastic spherical shell filled with ideal compressible liquid. The energy introduced in the form of pulses in the gas cavity in the central part of the system serves as the source of its excitation. The hypotheses used for the investigations by the finite-difference method are presented and a correct mathematical statement of the problem is formulated. We obtain the data on the behavior of stresses as function of time in the cases of free shell and of the partial rigid fixing of its surface. The effect of rigid fixing on the stress-strain state of the shell is analyzed.

75. Stavinskiy A., Plakhtyr O., Tsyganov A., Stavinskiy R. Possibilities of improving the transformers and reactors on the basis of multiple counters of the rods. *Proceedings of the International Conference on Modern Electrical and Energy Systems, MEES 2017*. 2018. Vol. 2018-January. P. 176-179. DOI: 10.1109/MEES.2017.8248882.

Technical solutions of transformers and reactors improvement by structural conversion of the elements of the active part are considered. Such conversion consists in the replacement of the traditional circular forming contours of the rods and winding coils by hexagonal and octagonal configurations. The decrease of material consumption and labor intensity of production as well as the increases of electrodynamical stability of the mentioned induction static devices are achieved.

76. Study of the process of grain prethreshing by working bodies of a combine harvester header / Sheychenko V. etc. Eastern-European Journal of Enterprise Technologies. 2017. Vol. 6, Issue 1-90. P. 19-27. DOI: 10.15587/1729-4061.2017.118276.

We improved the combined technological process of transportation and threshing of GSM and developed the device of preliminary grain threshing for a grain header of KZS 9-1 «Stavutich» harvester, which made it possible to separate 30-35 % of grain at the early phases of its transportation to TSS of a combine. We established that the coefficient of separation of grain from cones in a header with an intermediate thrashing drum, which contains four additional toothshaped bars of 30 mm in height, has the highest (0.32) value. We developed a calculation and experimental method for determining the amount (degree) of grain separation by a device of a header of a combine harvester. The method is based on the results of simulation of the combined process of transportation and threshing of grain caused by the interaction of a drum with grain and straw mass. We analyzed and proved the complex influence of structural parameters of the device and modes of implementation of the combined process of transportation and threshing of GSM at the level of separation of grain. And this make it possible to establish a theoretical dependence of the grain separation coefficient. The noted theoretical dependence provides the possibility to substantiate rational parameters and operating modes of the device of preliminary grain threshing of a combine harvester analytically. We determined dependences of the grain separation coefficient on the speed of a combine experimentally. The dependences take into account cancellations of mechanized technological operations caused by changes in kinematic operating modes of a combine, a number of stops and their height on a drum of a device of preliminary grain threshing.

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77. Atamanyuk I., Kondratenko Y., Sirenko N. Management system for agricultural enterprise on the basis of its economic state forecasting. *Studies in Systems, Decision and Control*. 2018. Vol. 125. P. 453-470. DOI:

10.1007/978-3-319-69989-9_27.

Management system (MS) for agricultural enterprise on the basis of its economic state forecasting was developed. MS allows to estimate the results of enterprise's work in future under the realization of certain reorganization (change of land resources, labour resources, fixed assets). Calculating method for forecasting economic indices of agricultural enterprises on the basis of vector polynomial exponential algorithm for extrapolation of the realizations of random sequences is worked out. The model of prognosis allows to estimate the results of enterprise functioning (to estimate future gross profit, gross production) after its reorganization. Prognostic model does not impose any restrictions on the forecast random sequence (linearity, stationarity, Markov behavior, monotone, etc.) and thus allows fully to take into consideration stochastic peculiarities of functioning of agricultural enterprises. The simulation results confirm high efficiency of introduced calculating method. The scheme for reflecting the peculiarities of the forecast model functioning are also presented in the chapter. The method can be realized in the decision support systems for agricultural and non-agricultural enterprises with various sets of economic indices.

78. Herasymchuk H. A., Baranovsky V. M., Herasymchuk O. O., Pastushenko A. S. Analytical research results of the combined root digger. INMATEH - Agricultural Engineering. 2018. Vol. 54, Issue 1. P. 63-72. URL: https://www.scopus.com/record/display.uri?eid=2-s2.0-85053484089&origin=resultslist&sort=plf-t&src=s&nlo=&nlr=&nls=&sid=543a12ce99e03bcf84eb2b6b7e23b1c4&sot=aff&sdt=cl&cluster=scopubyr%2c%222018%22%2ct&sl=56&s=AF-ID%28%22Mykolayiv+National+Agrarian+University%22+60108748%29&relpos=9&citeCnt=0&searchTerm=.

This paper researches the operation principle structure of a combined root digger that consists of two spherical disks and, above them, a horizontal shaft with cleaning blades. Mechanical and technological justification of structural and kinematic parameters and operating modes of combined digger was carried out based on the analysis of technological process of roots excavation. The dependence of digger operation on the condition of providing complete digging of the root crops is obtained. Deterministic mathematical models of the interaction between the cleaning blade and the root head provided no not dumping and non-damaging of root, were developed.

79. Atamanyuk I., Shebanin V., Volosyuk Y., Kondratenko Y. Generalized method for prediction of the electronic devices and information systems' state. *14th International Conference on Perspective Technologies and Methods in MEMS Design, MEMSTECH 2018* - Proceedings. 2018. 24 May 2018. P. 91-95. DOI: 10.1109/MEMSTECH.2018.8365709.

Generalized nonlinear method of the prediction of the state of electronic devices and information systems provided that the parameters of the devices are measured with errors is offered. Filter-extrapolator is synthesized on the basis of generalized nonlinear canonical expansion. Method of extrapolation doesn't impose any essential limitations on the series of random processes with discrete argument which are under investigation (linear, Markovian behavior, stationary, monotony etc.). Special attention paid to the changes of the condition of electronic devices and information systems for achieving maximum accuracy of the prediction problem solution.

80. Balashov I., Kramarenko S., Shyriaieva D., Vasyliuk O. Invasion of a crimean land snail brephulopsis cylindrica into protected relict steppic hilltops (tovtrs) in western Ukraine: A threat to native biodiversity? *Journal of Con-*

chology. 2018. Vol. 43. P. 59-69. URL: https://www.scopus.com/record/display.uri?eid=2-s2.0-85047562362&origin=resultslist&sort=plf-t&src=s&nlo=&nlr=&nls=&sid=543a12ce99e03bcf84eb2b6b7e23b1c4&sot=aff&sdt=cl&cluster=scopubyr%2c%222018%22%2ct&sl=56&s=AF-ID%28%22Mykolayiv+National+Agrarian+University%22+60108748%29&relpos=18&citeCnt=1&searchTerm=.

Brephulopsis cylindrica (Menke 1828), a snail native to the Crimea, has been expanding northward and westward, and has recently reached Western Ukraine. Three adjacent and abundant colonies have been found in the tovtrs (small rocky hilltop areas of protected relic steppic habitat) of the Podilski Tovtry National Nature Park in Western Ukraine. These sites and ten similar sites without B. cylindrica were sampled. Most of the snail species that occur in the other ten sites were absent from the samples from the sites with B. cylindrica, which have much lower molluscan diversity. It is suggested that B. cylindrica is excluding some threatened native snails that have comparable ecological preferences, notably Helicopsis striata. Possible mechanisms of competition with native species are discussed. The most likely explanation is that these native snails are displaced from seasonal refuges in rock crevices as a result of the high densities of B. cylindrica. The snails in Western Ukrainian populations of B. cylindrica are smaller than in populations from the Crimean mountains, but similar in size to populations from the Crimean plains, which may be where they originated.

81. Characteristics of the Genetic Structure of Snow Sheep (Ovis nivicola lydekkeri) of the Verkhoyansk Mountain Chain / Deniskova T. E. etc. *Russian Journal of Genetics*. Vol. 54, Issue 3. P. 328-334. DOI: 10.1134/S1022795418030031.

Genetic characteristics of the allele pool of four groups of the Yakut snow sheep subspecies (Ovis nivicola lydekkeri) inhabiting various parts of the Verkhoyansk Mountain Range such as Kharaulakh Ridge, Orulgan Ridge, ridges of the Central Verkhoyansk, and Suntar-Khayata Ridge is presented. Fragment analysis using 17 microsatellite loci was carried out using the ABI 3131xl genetic analyzer. Significant heterozygote deficiency was detected in all investigated snow sheep populations. Differentiation of the studied groups in accordance to their geographical origin was revealed.

82. Correction to: Reconstructed historical distribution and phylogeography unravels non-steppic origin of Caucasotachea vindobonensis (Gastropoda: Helicidae) (Organisms Diversity & Evolution, (2017), 17, 3, (679-692), 10.1007/s13127-017-0337-3) / Kajtoch Ł. etc. *Organisms Diversity and Evolution*. 2018. Vol. 18, Issue 2. P. 261-262. DOI: 10.1007/s13127-018-0363-9.

One of the author's name of this article was incorrectly published as "Chris Wade". This is now presented correctly in this article as "Christopher M. Wade".

83. Dykha Aleksandr, Marchenko Dmitry. Prediction the wear of sliding bearings. *International Journal of Engineering and Technology(UAE)*. 2018. Vol. 7, Issue 2. P. 4-8. DOI: 10.14419/ijet.v7i2.23.11872.

The problem of developing a calculation-experimental method for calculating wear of a sliding bearing based on a two-factor wear model (contact pressure - sliding velocity) with identification of wear resistance parameters was considered. On the basis of the proposed wear model, the wear-contact problem for a cylindrical sliding bearing was solved. The equation of equilibrium for medium pressures and the approximating function of linear wear from the arc of contact between the shaft and the bushing were used as the determining equations. To identify parameters of wear resistance in

the wear model, a calculation-experimental method for determining calculated dependences of wear resistance parameters was developed on the basis of the wear test by the «cone - three balls» scheme. The results of wear tests of bronze conical specimens with a variable wear spot and two values of sliding velocity were taken as a base. The obtained results were recommended for predicting wear of sliding bearings at the design stage and optimizing their design and operational parameters.

84. Genetic Polymorphism of Microsatellite Loci and Their Association with Reproductive Traits in Ukrainian Meat Breed Pigs / Lugovoy S. I. etc. *Cytology and Genetics*. Vol. 52, Issue 5. P. 360-367. DOI: 10.3103/ S0095452718050079.

The primary goal of the study was to estimate the genetic diversity and population structure of the Ukrainian Meat breed pigs. Twelve microsatellite markers were selected from the list of the microsatellites recommended by FAO/ ISAG. The range of alleles per locus (Na) was found to be from 5 to 14 with an average of 8.42, and a total of 101 alleles were observed at these loci. The observed heterozygosity (Ho) was averaged 0.668 and expected heterozygosity (He) was 0.718, respectively. The LD-based population effective size (Ne) estimate for the Ukrainian Meat breed pigs was 68.3 (95% CI: 52–92) individuals. This population has not undergone any recent and/or sudden reduction in the effective population size and remained at mutation–drift equilibrium. The SW24, SW951, SW240, S0101, SW936, and S0228 loci genotypes were found to affect the total number of piglets born (TNB), the number of piglets born alive (NBA), and the number of piglets weaned (NW).

85. Goncharuk A. G., Havrysh V. I., Nitsenko V. S. National features for alternative motor fuels market. *International Journal of Energy Technology and Policy*. 2018.

Vol. 14, Issue 2-3. P. 226-249. DOI: 10.1504/ IJETP.2018.090681.

The objective of this study is the identification of specific national aspects that influence the alternative motor fuel usage. Empirical and statistical data have been used. For economical estimation of fuels, mathematical and economic modelling was used. World progress of society and the use of power resources trends have been shown. It is determined, that the last years' bioethanol production growth is almost stable. But biodiesel production has been slowing down. Efficiency of biofuels utilisation has been analysed. Biofuels production is most developed in countries which have favourable climate conditions, high developed agriculture, enough agricultural area and government support. General and specific barriers for biofuel usage have been examined. Regions of concentrated alternative fuels use have been revealed. Modern economic factors which influence on a production and applications of alternative fuels have been shown. Basic national features have been revealed.

86. Infection of Predatory Fish with Larvae of Eustrongylides excisus (Nematoda, Dioctophymatidae) in the Delta of the Dnipro River and the Dnipro-Buh Estuary in Southern Ukraine / Goncharov S. L. etc. *Vestnik Zoologii*. 2018. Vol. 52, Issue 2. P. 137-144. DOI: 10.2478/vzoo-2018-0015.

The article describes occurrence and distribution of Eustrongylides trematodes in fish in the waters of the Dnipro-Buh estuary and the delta of Dnipro River in Mykolaiv and Kherson Region. Study was conducted in 2015-2016. This parasite was found in natural water reservoirs in Mykolaiv and Kherson region in following fish species: Sander lucioperca (Linnaeus, 1758), Perca fluviatilis (Linnaeus, 1758) and Esox lucius (Linnaeus, 1758). Ichtyopathological investigation of 346 fishes was conducted. Parasites were observed in abdominal cavity, muscle tissue, wall of gastro-

intestinal tract, gonads and hepatopancreas. P. fluviatilis was the most affected species, prevalence of infection was 85.1 %. Less infected were S. lucioperca and E. lucius, with the prevalence of infection 58.1 % and 58.9 % respectively. Mean prevalence of infection of predatory fish in studied reservoirs was 70.5 %. The intensity of infection was the highest in perch (1-14 nematodes per fish). The lowest intensity of infection was found in pike-perch (1-9 nematodes per fish).

87. Intra-population spatial structure of the land snail Vallonia pulchella (Müller, 1774) (Gastropoda; Pulmonata; Valloniidae) [Внутрипопуляционная пространственная структура наземного моллюска Vallonia pulchella (Müller, 1774) (Gastropoda; Pulmonata; Valloniidae)] / Kunakh O. N. etc. *Ruthenica*. 2018. Vol. 28, Issue 3. P. 91-99.URL: https://www.scopus.com/record/display.uri?eid=2-s2.0-85054659663&origin=resultslist&sort=plf-t&src=s&nlo=&nlr=&nls=&sid=543a12ce99e03bcf84eb2b6b7e23b1c4&sot=aff&sdt=cl&cluster=scopubyr%2c%2220180%22%2ct&sl=56&s=AF-ID%28%22Mykolayiv+National+Agrarian+University%22+60108748%29&relpos=1&citeCnt=0&searchTerm=.

This paper summarizes the mechanisms behind the patterning of the intra-population spatial arrangement of the land snail Vallonia pulchella in terms of edaphic and vegetation properties. The molluscs were collected from a regular grid in recultivated soil (the research station of Dnipro State Agrarian and Economic University, Pokrov, Ukraine). As predictors of the snail population abundance, spatial variables were used, as well as edaphic and vegetation indices. It is shown that V. pulchella prefers microsites characterized by higher soil electrical conductivity, which contain larger aggregate fractions with low mechanical impedance and the low temperature at the depth of 0-10 cm, with a more developed dead plant layer, low-light and low hygro-

morph and heliomorph index values of the vegetation. В статье рассмотрены механизмы фор мирования паттерна внутрипопуляционной про странственной организации наземного моллюска Vallonia pulchella с точки зрения эдафических и фитоценотических характеристик мест обитания. Сбор моллюсков проводился с использованием регулярной сетки на рекультивированной почве (исследовательская станция Днепровского государственного аграрно-экономического университета, г. Покров, Украина). В качестве предикторов численности популяции улиток использовались пространственные переменные, а также физико-химические характеристики почвы и фитоценотические показатели. Показано, что V. pulchella предпочитает локальные участки, характеризующиеся более высокой электропроводностью почвы, содержащей более крупные агрегатные фракции, с низкой твердостью и температурой слоя на глубине 0-10 см, с более развитым сухостоем, низкой освещенностью и с низкой долей гигроморф и гелиоморф в растительном покрове.

88. Kalinichenko A., Havrysh V., Hruban V. Heat recovery systems for agricultural vehicles: Utilization ways and their efficiency. *Agriculture (Switzerland)*. 2018. Vol. 8, Issue 12. DOI: 10.3390/agriculture8120199.

The focus of today's agriculture is to reduce fuel consumption and pollutant emission. More than 50% of the fuel energy is lost with the exhaust gas and coolant of diesel engines. Therefore, waste heat recovery systems are a promising concept to meet economical and ecological requirements. Agricultural vehicles have an operating cycle that is quite different from on-road trucks (higher engine load factor and less annual utilization). This has influence on the efficiency of waste heat recovery. The purpose of this paper was to analyze different waste heat recovery technologies to be used in agricultural applications. In the study, technical and eco-

nomic indicators have been used. According to suggested classification, four pathways for utilization were studied. Turbocompounding, electric turbocompounding, and heating of transmission oil for hydraulic clutch gearboxes have proved to be effective for agricultural vehicles. For the economical conditions of the European Union (EU), a turbocompounding diesel engine is acceptable if agricultural tractor rated power is more than 275 kW, and combine harvester rated power is more than 310 kW. In cold climates, heat recovery transmission warm-up may be recommended. Waste heat absorption refrigerators have proven to be a viable technology for air conditioning and intake air cooling systems.

89. Kondratenko Y. P., Kozlov O. V., Kondratenko G. V., Atamanyuk I. P. Mathematical model and parametrical identification of ecopyrogenesis plant based on soft computing techniques. *Studies in Systems, Decision and Control*. 2018. Vol.125, P. 201-233. DOI: 10.1007/978-3-319-69989-9_13.

This paper presents the development of the mathematical model and system of parametrical identification for the ecopyrogenesis (EPG) plant as a complex multi-coordinate control object on the basis of soft computing techniques. The synthesis procedure of the main parts of the EPG plant's mathematical model, including its fuzzy parametrical identification system, adaptive-network-based fuzzy inference system for calculating of multiloop circulatory system (MCS) temperature and Mamdani type fuzzy inference system for calculating of reactor load level, is presented. The analysis of computer simulation results in the form of static and dynamic characteristics graphs of the EPG plant confirms the high adequacy of the developed complex neuro-fuzzy model to the real processes. The developed mathematical model with parametrical identification based on neuro-fuzzy technologies gives the opportunity to investigate the behavior of the given complex control object in steady and transient

modes, in particular, to synthesize and adjust the intelligent controllers of the multi-coordinate automatic control system of the EPG plant.

90. Mishchenko A. V., Mishchenko E. V., Venger E. A., Kachuk D. S. Comparative evaluation of polyurethane ionomers of sulfonate and carboxylate types as binders of pigment printing systems. *Voprosy Khimii i Khimicheskoi Tekhnologii*. 2018. Issue 5. P. 116-124. URL: https://www.scopus.com/record/display.uri?eid=2-s2.0-85055267052&origin=resultslist&sort=plf-t&src=s&nlo=&nlr=&nls=&sid=543a12ce99e03bcf84eb2b6b7e23b1c4&sot=aff&sdt=cl&cluster=scopubyr%2c%222018%22%2ct&sl=56&s=AF-ID%28%22Mykolayiv+National+Agrarian+University%22+60108748%29&relpos=0&citeCnt=0&searchTerm=.

The paper summarizes the results of the study devoted to the use of a new type of film formers, self-dispersing aqueous dispersions of polyurethane ionomers, as binders in pigment compositions for the textile materials printing. A distinctive feature of the polymers of this type is that their macromolecules contain various ionic groups introduced into the main chain of the urethane block-copolymer or the chain extender, in particular, the sulfo- or carboxyl groups. The colloid-chemical properties of aqueous dispersions of polyurethane ionomers of anionic and cationic types were investigated in terms of the physical and mechanical characteristics of polymer films and the quality indicators of printing by pigment compositions in which the dispersions under study were used as binders. It has been shown that polymers from the group of ion-containing polyurethanes having anionic character can be recommended as pigment binding agents. Polymers containing carboxyl groups are more effective as binders among the polyurethanes of the anionic type, because these polymers provide greater resistance to dyes by wet treatments, a milder

stamp of printed textiles and stable printing results. A higher intensity of colors was observed which are formed with the use of carboxyl-containing polymers due to the lower polymer ability to microphase separation. This property is manifested in the heat treatment of printed textile material by the clouding of polymer films, which results in a decrease in the intensity of coloration. It has been shown that more intense and stronger colors are formed by using of cationic polymers as compared with the anionic ones (but the latter cannot be used due to their high coagulation ability as binding agents). Cationic polyurethanes can be recommended to be used with special equipment, for example, when printing on fabrics using airbrushes.

91. Mudrak R., Lagodiienko V., Lagodiienko N.Impact of aggregate expenditures on the volume of national production. *Economic Annals-XXI*. 2018. Vol.172, Issue 7-8. P. 44-50. DOI: 10.21003/ea.V172-08.

Ukrainian economy, which is recovering after the severe crisis in 2009, has shown obvious signs of macroeconomic instability over the last five years, namely the slowdown of economic growth in 2012-2013 and the recession during the 2014-2015 period. One of the main reasons for this is the irrational structure of national consumption. The present study allows finding out that the biggest defects of the structure of the aggregate expenditures of the Ukrainian economy are the reduction in the share of gross capital formation and an increase in the share of net export with minus. The main factors hampering private capital formation in Ukraine are the reduction of national savings and excessive market concentration. Rapid inflation rates and an extremely low level of confidence in financial intermediaries from the part of Ukrainian households to buy foreign currencies, which they save as non-performing assets (cash). This is an extraction of resources from the «profits-expenditures» flow, which do not work for the economy and are extremely scarce. The chronic negative net export of

Ukraine is connected with unsatisfactory terms of trade, because high-tech science-intensive products and excessive amounts of hydrocarbons are imported, and the products with a low level of processing are mainly exported. This is explained by the insufficient tempo of technological modernisation of the Ukrainian economy and innovation lag: 40% of workers employed in the industry are engaged in the production at the low technological level, about 20% - at the average level and only 2.5% - at the high level. The increase of GDP due to the introduction of new technologies in Ukraine is estimated at 0.7-1%, while in developed countries it reaches 60% and more. Comparison of Ukraine with other European countries in terms of aggregate expenditures structure in 2012-2017 substantiated the need for deep structural change in the country.

92. Olijnichenko L., Hruban V., Lichuk M., Pirogov V. On the limited accuracy of balancing the axial fan impeller by automatic ball balancers. *Eastern-European Journal of Enterprise Technologies*. 2018. Vol. 1, Issue 1-91. P. 27-35. DOI: 10.15587/1729-4061.2018.123025.

The study explores the process of dynamic balancing of the impeller of an axial fan VO 06-300 (Ukraine) by two automatic ball balancers. The computer simulation of the dynamics of the fan in the absence and presence of automatic balancers has confirmed the qualitative results of a previously conducted field full-scale experiment. Thus, the presence of automatic balancers reduces the following: - the mean square value of the vibration velocity in the segment from the rotor start to the beginning of automatic balancing, - the vibration velocity values at two resonant peaks when the rotor is running down, and - the peaks of the vibration velocities in the section of the start of automatic balancing (74 times in the 3D modelling; 5.4 times in the field experiment). The computer simulation of the dynamics of the axial fan with the «on» and «off» gravity forces has allowed determining the following: -

the effect of gravity on the accuracy of balancing the impeller decreases rapidly with increasing the cruising speed of the impeller, - when increasing the forces of viscous resistance to the motion of the balls, the effect of gravity on the accuracy of the rotor balancing increases; - at low speeds of rotation (15 r/s), the impeller can be balanced not better than by accuracy class G 2.5, but at the rated speed of 25 r/s, it is balanced according to accuracy class G 1. Herewith, the residual vibration velocities that are caused only by gravity decrease with increasing the rotor speed. The residual vibration velocities that are caused only by the eccentricities of the raceways increase directly proportionally to the rotor speed. Therefore, fast-turning rotors need a more precise installation of automatic balancers. It is recommended to reduce the eccentricity of the raceway of the automatic balancer at least 2.5 times in relation to the maximum permissible value. Residual vibration velocities in the automatic balancing mode (up to 3 mm/s) on the test fan are mostly caused by gravity. The probable causes of residual vibration velocities are eccentricities of the raceways of the automatic balancers, standstill of the balls (lack of reaction to small unbalances), etc. Therefore, residual vibration velocities can be reduced at the stages of manufacturing and installing automatic balancers into a fan.

93. Pasichnyk M., Kucher E., Hyrlya L. Synthesis of magnetite nanoparticles stabilized by polyvinylpyrrolidone and analysis of their absorption bands. *Eastern-European Journal of Enterprise Technologies*. 2018. Vol. 3, Issue 6-93. P. 26-32. DOI: 10.15587/1729-4061.2018.132057.

We report results of studying the synthesis of magnetite nanoparticles. The formed dispersions were explored with the use of the spectrophotometric method. The spectra of optical absorption of nanomagnetite dispersions were analyzed using the theory of plasmon oscillations. Synthesis of nanoparticles was performed in the aqueous solution and with the use of 3.5 % polyvinylpyrrolidone as dispersed me-

dium. The ratio of salts of ferrum (III)/(II) was 1.5:1. Working concentrations of reactive substances were chosen, which resulted in the formation of stable dispersions of nanoparticles with magnetic properties. It was shown that when changing the amount and the method of introduction of ammonia solution into the system, more stable dispersions of nanoparticles are formed. As a result of the research into surface plasmon resonance of magnetite nanoparticles dispersions, it was found that all synthesized solutions are characterized by a maximum of absorption at the wavelength of 350 nm, however, intensity of absorption bands directly depends on dimensions of the particles. Magnetite nanoparticles, synthesized with the use of 3.5 % polyvinylpyrrolidone (PVP) as dispersed medium, are characterized by existence of three bands at 350 nm, 950 nm, and 1,050 nm. The possible mechanism of stabilization of magnetite nanoparticles in polyvinylpyrrolidone was proposed. In the course of the study, it was found that polyvinylpyrrolidone, on the one hand, contributes to nucleation, and on the other hand, effectively stabilizes nanoparticles.

94. Shebanin V. S., Kondratenko Y. P., Atamanyuk I. P. The method of optimal nonlinear extrapolation of vector random sequences on the basis of polynomial degree canonical expansion. *Advances in Intelligent Systems and Computing*. 2018. Vol. 730. P. 14-25. DOI: 10.1007/978-3-319-75792-6_2.

The given work is dedicated to the solving of important scientific and technical problem of forming of the method of the optimal (in mean-square sense) extrapolation of the realizations of vector random sequences for the accidental quantity of the known values used for prognosis and for various order of nonlinear stochastic relations. Prognostic model is synthesized on the basis of polynomial degree canonical expansion of vector random sequence. The formula for the determination of the mean-square error of the extrapolation which al-

lows us to estimate the accuracy of the solving of the prognostication problem with the help of the introduced method is obtained. The block diagrams of the algorithms of the determination of the parameters of the introduced method are also presented in the work. Taking into account the recurrent character of the processes of the estimation of the future values of the investigated sequence the method is quite simple in calculating respect. The introduced method of extrapolation as well as the vector canonical expansion assumed as its basis doesn't put any essential limitations on the class of prognosticated random sequences (linearity, Markovian property, stationarity, scalarity, monotony etc.).

95. Stavinskii A., Vakhonina L., Sadovoy O., Saravas V. Weight-to-price indicators of electromagnetic systems single-phase transformers and reactors with twisted magnetic circuits. *Proceedings of the International Conference on Modern Electrical and Energy Systems*, MEES 2017. 2018. Vol. 2018-January. P. 172-175.

New technical proposals for improvement by changing the configuration and position in the space of active elements in order to reduce the material capacity and increase the reliability of single-phase transformers and reactors are presented. Based on mathematical models with partial or integral optimization criteria and a set of independent and dependent control variables, the optimal mass and cost parameters of single-phase electromagnetic systems variants that differ in the structure and configuration of the active elements are determined.

96. Study and development of the technology for hardening rope blocks by reeling / Dykha A. etc. *Eastern-European Journal of Enterprise Technologies*. 2018. Vol. 2, Issue 1-92. P. 22-32. DOI: 10.15587/1729-4061.2018.126196.

The study of the efficiency of hardening the parts working in spalling conditions through reeling with rollers were per-

formed with the help of physical simulation and showed the high effect of hardening cast steels (a 10- to 14-fold increase in durability). The depth and degree of work hardening during plastic deformation of the surface layer were studied by the method of regression analysis. It was found that the 95-% confidence intervals for the depth of work hardening calculated from the results of measurements of yield strength make up 11-36 % of the hardening depth and 32-75 % by the hardness measurements. Electrography examination has shown that an increase in the degree of work hardening when reeling with a needle roller manifests itself in a higher dislocation density and cell size decrease in the substructure of ferrite grains. Diffusion of chemical elements in the surface layer in the process of surface deformation was studied with an analysis of the change of the surface microhardness. It was established that the content of Cr and C decreased by 20-30 % in the transition zone and increased to 10-15 % in the hardened layer. The main mechanism of diffusion during SFW is the dislocation density gradient. The process of the contact friction surface wear during reeling with consideration of slippage was investigated. It was proved that roughness of the friction surfaces affects the coefficient of friction and the rate of tribo-contact wear during reeling with slippage. For example, with a decrease in surface roughness after reeling with rollers, coefficient of friction for the lubricated surfaces decreases. A procedure for determining conditions of reeling with a wedge roller was developed. A method, technology, and a device for reeling the rope blocks with a wedge roller were developed to provide low roughness and high degree of work hardening of the surface. Optimal reeling conditions were found due to experiment planning using the steep convergence method. The obtained results of calculations will serve as initial data in designing working elements of the reeling devices and developing technological processes for strengthening parts. The conducted studies will find their future use in evaluation of the wear processes tak-

ing into account slippage of the «rope block - rope» friction couple.

97. Yatsun V., Filimonikhin G., Haleeva A., Nevdakha A. On stability of the dual-frequency motion modes of a single-mass vibratory machine with a vibrat ion exciter in the form of a passive auto-balancer. *Eastern-European Journal of Enterprise Technologies*. 2018. Vol. 2, Issue 7-92. P. 59-67. DOI: 10.15587/1729-4061.2018.128265.

By employing computational experiments, we investigated stability of the dual-frequency modes of motion of a single-mass vibratory machine with translational rectilinear motion of the platform and a vibration exciter in the form of a passive auto-balancer. For the vibratory machines that are actually applied, the forces of external and internal resistance are small, with the mass of loads much less than the mass of the platform. Under these conditions, there are three characteristic rotor speeds. In this case, at the rotor speeds: - lower than the first characteristic speed, there is only one possible frequency at which loads get stuck; it is a pre-resonance frequency; - positioned between the first and second characteristic speeds, there are three possible frequencies at which loads get stuck, among which only one is a pre-resonant frequency; - positioned between the second and third characteristic speeds, there are three possible frequencies at which loads get stuck; all of them are the over-resonant frequencies; - exceeding the third characteristic speed, there is only one possible frequency at which loads get stuck; it is the over-resonant frequency and it is close to the rotor speed. Under a stable dual-frequency motion mode, the loads: create the greatest imbalance; rotate synchronously as a whole, at a preresonant frequency. The auto-balancer excites almost perfect dualfrequency vibrations. Deviations of the precise solution (derived by integration) from the approximated solution (established previously using the method of the small parameter) are equivalent to the ratio of the mass of loads to the mass of the entire ma-

chine. That is why, for actual machines, deviations do not exceed 2 %. There is the critical speed above which a dual-frequency motion mode loses stability. This speed is less than the second characteristic speed and greatly depends on all dimensionless parameters of the system. At a decrease in the ratio of the mass of balls to the mass of the entire system, critical speed tends to the second characteristic speed. However, this characteristic speed cannot be used for the approximate computation of critical speed due to an error, rapidly increasing at an increase in the ratio of the mass of balls to the mass of the system. Based on the results of a computational experiment, we have derived a function of dimensionless parameters, which makes it possible to approximately calculate the critical speed.

2019 рік

98. Atamanyuk I., Kacprzyk J., Kondratenko Y.P., Solesvik M. Control of Stochastic Systems Based on the Predictive Models of Random Sequences. *Studies in Systems, Decision and Control*. 2019. Vol. 203. P. 105-128. DOI: 10.1007/978-3-030-21927-7_6.

This chapter is devoted to the development of the mathematical models of stochastic control systems based on the predictive models of random sequences. In particular, the linear algorithms of the forecast of a control object state for an arbitrary number of states of an investigated object and the values of a control parameter are obtained. In a mean-square sense, the algorithms allow one to get an optimal estimation of the future values of a forecasted parameter, in case true known values for an observation interval are used, provided that the measurements are made with errors. Using an arbitrary number of non-linear stochastic relations, a predictive model of a control system is obtained as well. The schemes that reflect the peculiarities of determining the parameters of a nonlinear algorithm and its functioning regularities are

introduced in the work. Developed models allows one to take the peculiarities of the sequence of the change of control object parameters into full consideration and also to make full use of all known priori and posteriori information about the random sequence that was investigated. The algorithms obtained in this chapter can be used in different areas of human activity to solve a wide range of problems of the control of the objects of stochastic nature.

99. Change of yield and baking qualities of winter wheat grain depending on the year of growingand predecessor in the central forestry of Ukraine / Panchenko T. etc. *Plant Archives*. 2019. Vol. 19, Issue 1. P. 1107-1112. URL:https://www.scopus.com/record/display.uri?eid=2-s2.0-85068555460&origin=resultslist&sort=plf-t&src=s&nlo=&nlr=&nls=&sid=e64d558bca8f742411684f2709c144e6&sot=aff&sdt=cl&cluster=scopubyr%2c%2222019%22%2ct&sl=56&s=AF-ID%28%22Mykolayiv+National+Agrarian+University%22+60108748%29&relpos=1&citeCnt=0&searchTerm=.

One of the least costly and highly effective ways to increase crop yield and quality of winter wheat is compliance with crop rotation and the selection of best preceding crops. Unfortunately, in modern conditions of intensive agricultural production, it is difficult to do this. The purpose of our research was to study the formation of the yield and grain quality of soft winter wheat (Triticum aestivum L.) Zolotokolosa variety depending on the conditions of the year with different predecessors. We also studied the effect of these factors on the grain quality when cultivating winter wheat under the conditions of the Scientific and Production Center (SPC) of Bila Tserkva National Agrarian University (BTNAU). The use of predecessors with late harvesting dates, which strongly dry the soil during the sowing period, leads to a significant reduction in yield on 14.3-26.5 dt/ha. This is on 20.0-36.9% less than after peas for grain. The

best yields were obtained with such predecessors as peas and rape, that early clear the field: growing winter wheat after them contributed to yield in average 71.4-71.9 dt/ha per four years. The part of the predecessor's effect on the value of yield is 82.36%, and the year of cultivation is 14.83%. The right choice of predecessors increases yields and improves quality of the grain. Such important for the baking industry indicators as gluten and protein rise.

100. Forecasting of cereal crop harvest on the basis of an extrapolation canonical model of a vector random sequence / Atamanyuk I. etc. *CEUR Workshop Proceedings*. 2019. Vol. 2393. P. 302-315. UR: https://www.scopus.com/record/display.uri?eid=2-s2.0-85069450903&origin=resultslist&sort=plf-t&src=s&nlo=&nlr=&nls=&sid=e64d558bca8f742411684f2709c144e6&sot=aff&sdt=cl&cluster=scopubyr%2c%222019%22%2ct&sl=56&s=AF-ID%28%22Mykolayiv+National+Agrarian+University%22+60108748%29&relpos=5&citeCnt=0&searchTerm=.

The work is devoted to the solving of an important economic problem of the forecasting of cereal crop harvest. A stochastic character of the change of crop yield figures because of the influence of random weather-related factors is an essential peculiarity of this problem. Therefore, to forecast the cereal crop harvest, the methods of random sequence analysis are proposed to use. The developed extrapolation method doesn't impose any restrictions on a forecasted random sequence of the change of crop yield figures (linearity, stationarity, Markov behavior, monotony, etc.). Taking into full account stochastic peculiarities of the conditions of cereal crop production and crop yield figures allows to achieve maximum accuracy of a forecasting problem solving. The block diagram of an algorithm introduced in the work represents the peculiarities of the calculation of the predictive model pa-

rameters. The expression for calculation of an extrapolation error allows to determine necessary volume of a priori and a posteriori information for achieving required quality of a forecasting problem solving. The results of a numerical experiment confirmed high efficiency of the suggested method of forecasting of the cereal crop harvest.

101. Formation of photosynthetic and grain yield of spring barley (Hordeum vulgare L.) depend on varietal characteristics and plant growth regulators / Panfilova A. etc. *Agronomy Research*. 2019. Vol. 17, Issue 2. P. 608-620. DOI: 10.15159/AR.19.099.

The aim of the study was to determine the efficiency of the barley treatment crops with modern retrograde preparations on the background of the mineral fertilizers introduction into the photosynthetic activity of crops and grain yield. The experiments were carried out in 2013-2017 on the southern black soil in the conditions of the Ukrainian Steppe. On the basis of the study results, it was determined that the introduction of irrigated fertilizer barley in a dose of N30 P30 (background) under pre-sowing cultivation and the application of extra-root crop supplements at the phases beginning of the barley outflow straw into the tube and the organoleptic fermentation of Organic D2 and natural microbial complex Escort-Bio creates favorable conditions for the formation at the optimal levels of photosynthetic parameters and grain yield. Thus, on average, over the years of research and by factor variety, grain yield on these experimental variants was 3.37–3.41 t ha-1, which exceeded its level on uncontrolled control by 0.71–0.75 t ha-1 or 26.7– 28.2%. Based on the study results, the use of modern regenerating agents against the background of mineral fertilizers can be recommended as an expedient and effective measure of spring barley raising the productivity.

102. Havrysh V., Nitsenko V., Bilan Y., Streimikiene D. Assessment of optimal location for a centralized biogas

upgrading facility. *Energy and Environment*. 2019. Vol. 30, Issue 3. P. 462-480. DOI: 10.1177/0958305X18793110.

Since the 1990s, the volume of biogas produced in the world has been increasing. Biomethane (upgraded biogas) is a more versatile renewable fuel. Biogas transportation from production sites to upgrading facilities induces a scale advantage and an efficiency increase. Therefore, exploration of costs and energy use of biogas transportation using dedicated infrastructure is needed. A mathematical model to determine the optimum location for a certain biogas upgrading plant has been presented. It was developed to describe a local biogas grid that is used to collect biogas from several digesters and to deliver it to a central upgrading point. The model minimizes operational and maintenance costs per volumetric unit of biogas. The results indicate that cooperation between biogas producers in collecting biogas by means of a star layout reduces the cost of biomethane production (investment costs by 22.4–24.8% and operating and maintenance costs by 1.7–10.9%) relative to using a decentralized method. Merging smaller digesters into a smaller number of larger biogas upgrading plants reduces the biomethane production costs for the same biogas volume source.

103. Improving staff stimulation systems: Causal-consequence approach / Goncharenko O. etc. *International Journal of Engineering and Advanced Technology*. 2019. Vol. 8, Issue 5. P. 891-894. URL: https://www.scopus.com/record/display.uri?eid=2-s2.0-85069925691&origin=resultslist&sort=plf-t&src=s&nlo=&nlr=&nls=&sid=0ab0d1c37d2184c70afd76ffa380bb04&sot=aff&sdt=cl&cluster=scopubyr%2c%222019%22%2ct&sl=56&s=AF-ID%28%22Mykolayiv+National+Agrarian+University%22+60108748%29&relpos=14&citeCnt=1&searchTerm=.

An effective system of staff motivation is one of the most sig-

nificant factors in the competitiveness of modern organizations. In this regard, managers and personnel managers face an urgent task-to find ways to increase the motivation of the organization's personnel. To solve it, an in-depth scientific study of the problems of personnel motivation in market conditions is necessary to offer scientifically based recommendations and methodologies for building a motivation system, in particular using methods of mathematical modelling.

104. Kalinichenko A., Havrysh V. Environmentally Friendly Fuel Usage: Economic Margin of Feasibility. *Ecological Chemistry and Engineering S*. 2019. Vol. 26, Issue 2. P. 241-254. DOI: 10.1515/eces-2019-0030.

In the world there are two main problems concerning energy and ecology. Despite the crude oil price fluctuation, it has tended to increase. Moreover fossil fuel burning emits hazard compounds, including greenhouse gas. To solve them alternative fuels for vehicle have to be used. In due to properties, their usage impacts on the engine efficiency. The alternative fuel usage needs additional investment costs on the vehicle engines adaptation and fuel supply infrastructure. So, decisions must be based on mathematical apparatus. Three submodels were used in the suggested mathematical model: energy and economic indicator for fuels; energy and economic indicator for vehicles; criteria for investment projects. As a criterion of investment projects the profitability index has been grounded. The mathematical model and the algorithm for determining the feasibility of the alternative fuel utilization have been developed. The proposed algorithm includes the following stages: calculation of the fuel energy cost; calculation of the criteria for vehicles; determining the maximum value of investments; making decisions. Biofuels and gaseous fuels for some countries have been studied. The economic attractiveness of the alternative transport fuels has been presented. According to mathematical modeling, gaseous fuels are more economically attrac-

tive compared with liquid biofuels. Among gaseous fuels, LPG has a higher economic efficiency. The economic margin of alternative fuel application feasibility has been determined.

105. Kalinichenko A., Havrysh V. Feasibility study of biogas project development: Technology maturity, feedstock, and utilization pathway. *Archives of Environmental Protection*. 2019. Vol. 45, Issue 1. P. 68-83.

Biogas production has a big potential to provide clean energy. To evaluate the future production and maturity of biogas technology the generalized Weng model was proved to be effective, due to it has the minimum error. The simple algorithms to determine its parameters have been proposed. The simulation results for China, USA, and EU have been presented. The quantity and quality analysis for biogas feedstock has been carried out. Energy Return on Energy Invested (EROEI) indicator for different biofuels was considered. According to analysis done biogas from maize residue and chicken manure has high EROEI. Shannon Index was suggested to evaluate the diversity of feedstock supply. Biomass energy cost indicator was grounded to be used for feedstock energy and cost assessment. Biogas utilization pathways have been shown. Biogas boilers and CHP have the highest thermal efficiency, but biogas (biomethane) has the highest potential to earn as a petrol substitute. Utilization of biogas upgrading by-product (carbon dioxide) enhances profitability of biogas projects. Methods to assess the optimal pathways have been described.

106. Kotykova O., Babych M. Economic impact of food loss and waste. *Agris On-line Papers in Economics and Informatics*. 2019. Vol. 11, Issue 3,Pp. 55-71. DOI: 10.7160/aol.2019.110306.

The unproductive use of natural resources such as land and water, resulting from food loss and waste, constrains the pur-

suit of such tasks as overcoming hunger and poverty, ensuring adequate nutrition, increasing income and economic growth. Purpose of the article: According to the results of empirical research to identify the level of economic damage and lost revenue as a result of the food loss and waste, as well as to identify potential benefits for the agricultural land use in reducing those losses. Methods: The analysis was conducted in terms of regions and product types. The methodology proposed by FAO is used to calculate the food loss and waste for each type of product in Ukraine. Findings & Value added: Firstly, it has been empirically proven that food loss and waste result in significant economic damage and lost revenue. Secondly, the reduction of food loss and waste has positive environmental and social consequences.

107. Method of an optimal nonlinear extrapolation of a noisy random sequence on the basis of the apparatus of canonical expansions / Atamanyuk I. etc. *Advances in Intelligent Systems and Computing*. 2019. Vol. 836. P. 329-337. DOI: 10.1007/978-3-319-97885-7_32.

Method of optimal nonlinear extrapolation of a random sequence provided that the measurements are carried out with an error is developed using the apparatus of canonical expansions. Filter-extrapolator does not impose any essential limitations on the class of predictable random sequences (linearity, Markovian behavior, stationarity, monotony etc.) that allows to achieve maximum accuracy of the solution of a prediction problem. The results of a numerical experiment on a computer confirmed high effectiveness of the introduced method of the prediction of the realizations of random sequences. Expression for a mean-square error of extrapolation allows to estimate the quality of a prediction problem solving using a developed method. The method can be used in different spheres of science and technics for the prediction of the parameters of stochastic objects.

108. Mishchenko A. V., Mishchenko E. V., Venger E. A.,

Kachuk D. S. Popovych T. A. Increasing the hydrolytic stability of the films of polyurethane ionomers used for pigment colorings. V*oprosy Khimii i Khimicheskoi Tekhnologii*. 2019. Issue 5, Pp. 84-92. DOI: 10.32434/0321-4095-2019-126-5-84-92.

The paper reports the results of the study on the hydrolytic stability of films obtained from aqueous dispersions of polyurethane ionomers of sulfonate and carboxylate types, in particular the effect of the process duration of films in aqueous solutions of soda and surface-active substances on the bursting tension during stretching was investigated. This indicator is important when using dispersions as binders in pigment compositions for the printing of textile materials, because the indicators of the stability of colorings to wet treatments, in particular to washing, depend on the properties of dispersions. It was found that the investigated polyurethane ionomers do not provide the stability indicators, which would be expected from a polyurethane nature of the binder. An assumption was made that this results from an insufficient stability of some polyurethanes to hydrolysis. For increasing the polymer stability to hydrolysis and the stability of colorings to wet treatments, we tested the possibility of increasing the density of a three-dimensional structure of polyurethane. To this end, pre-condensates of thermosetting resins, which are widely used in finishing works, were used. An increase in the stability of both films of polyurethane ionomers and the coloring formed was stated when using the binders of the specified type in the presence of pre-condensates of thermosetting resins. The mechanism of the action of the pre-condensates of thermosetting resins was determined in the formation of polyurethane films. It was established that a high efficiency of additives of pre-condensates of thermosetting resins towards the polyurethane binder is ensured by the resin formation and the formation of a composite-type film with increased strength characteristics on the surface of a fabric. The formation of a polymer system of the specified type provides high

coloring stability and improves performance characteristics of a textile material.

109. Modeling safflower seed productivity in dependence on cultivation technology by the means of multiple linear regression model / Vozhehova R. etc. *Journal of Ecological Engineering*. 2019. Vol. 20, Issue 4. P. 8-13. DOI: 10.12911/22998993/102608.

The results of the study devoted to the evaluation of reliability of the multiple linear regression model for safflower seed yields prediction were presented. Regression model reliability was assessed by the direct comparison of the modeled yields values with the true ones, which were obtained in the field trials with safflower during 2010-2012. The trials were dedicated to study of the effect of various cultivation technology treatments on the safflower seed productivity at the irrigated lands of the South of Ukraine. The agrotechnological factors, which were investigated in the experiments, include: A - soil tillage: A1 - disking at the depth of 14-16 cm; A2 - plowing at the depth of 20-22 cm; B - time of sowing: B1 - 3rd decade of March; B2 - 2nd decade of April; B3 - 3 rd decade of April; C - inter-row spacing: C1 - 30 cm; C2- 45 cm; C3 - 60 cm; D - mineral fertilizers dose: D1 - N 0 P 0 ; D2 - N 30 P 30 ; D3 - N 60 P 60 ; D4 - N 90 P 90 . Regression analysis allowed us to create a model of the crop productivity, which looks as follows: Y = -1.3639 + 0.0213X 1 + 0.0017X 2 - 0.0121X 3 + 0.0045X 4 , where: Y is safflower seed yields, t ha -1 ; X 1 - soil tillage depth, cm; X 2 - sum of the positive temperatures above 10°C; X 3 - inter-row spacing, cm; X 4 - mineral fertilizers dose, kg ha -1 . A direct comparison of the modeled safflower seed yield values with the true ones showed a very slight inaccuracy of the developed model. The maximum amplitude of the residuals averaged to 0.27 t ha -1 . Therefore, we conclude that multiple linear regression analysis can be successfully used in purposes of agricultural modeling.

110. Models and algorithms for prediction of electrical energy consumption based on canonical expansions of random sequences / Atamanyuk I. etc. *Studies in Systems, Decision and Control*. 2019. Vol. 171. P. 397-421. DOI: 10.1007/978-3-030-00253-4_17.

The given chapter is devoted to the development of the mathematical support, in particular, mathematical models and algorithms, which can be successfully used for solving prediction tasks in various areas of human activity, including energetic and ecological management. The development peculiarities and the use of models and algorithms as elements of green technology to predict electric energy consumption based on mathematical apparatus of canonical expansions of random sequences are currently being discussed. Developed calculation method doesn't impose any limitations on the qualities of random sequences of the change of electric energy consumption (requirement of linearity, Markovian behavior, monotony, stationarity etc.) and has maximal accuracy characteristics in this connection. Block diagrams of algorithms and results of the applied realization of the developed models and algorithms, for example the prediction of electric energy consumption by one of the local neighborhoods in Mykolaiv, Ukraine are introduced in the work. Comparative analysis of the results of a numerical experiment with the use of a Kalman filter and the linear prediction method confirms the high efficiency of the developed models and algorithms (relative error of prediction of electric energy consumption is 2–3%).

111. New findings of pest sciarid species (Diptera, Sciaridae) in Ukraine, with the first record of Bradysia difformis / Babytskiy A.I. etc. *Biosystems Diversity*. 2019. Vol. 27, Issue 2. P. 131-141. DOI: 10.15421/011918.

Sciarids (Diptera, Sciaridae) or black fungus gnats are small, mainly dark coloured insects whose larvae usually develop in rotting plant remains permeated by fungal hyphae. Typical

habitats for sciarids are shaded forests and wet meadows, but some species can migrate from natural biotopes to anthropogenic ecosystems and live as synanthropes. Synanthropic sciarid species in the case of their larvae mass development, may cause significant damage to agricultural plants and mushrooms and are considered as pests. The information on pest activities of sciarids in the literature is provided for 34 species, but only 7 species can be considered as dangerous pests. In the framework of taxonomic and ecological research on Sciaridae in Ukraine, some chorological and faunistic peculiarities of pest sciarids have been studied. We collected material during the expeditions and excursions in different biotopes of Ukraine from 2012 to 2018 using the Malaise trap, by the method of non-count sweeping with entomological net and with exhauster directly from substrate. The collected imagoes were placed into 5 mL vials with 70% ethanol. In the lab, the fixed material was dehydrated in absolute ethanol and mounted on slides in Euparal. All of the studied material is kept in Andriy Babytskiy's Private Collection, Kyiv (PABK) and mostly availible to the public on the UkrBIN. In Ukraine 4 species of harmful sciarid pests from 3 genera are recorded, namely Bradysia brunnipes (in Crimea), B. difformis (in Kyiv and Volyn Regions), Lycoriella ingenua (in Kyiv and Volyn Regions) and Pnyxia scabiei (Western regions excluding the Carpathians). B. brunnipes, also known as "cucumber gnat", is one of the widespread cucumber pests in greenhouses, damaging roots and above-ground shoots of cucumbers. In Ukraine, mass development of this species and significant loses of the harvest caused by it have not been reported. B. difformis is a widespread pest sciarid, but in Ukraine it has been recorded for the first time. The mass development of this species was recorded in hothouses with cacti and other succulent plants at the O. V. Fomin Botanical Garden, where the larvae of B. difformis cause significant damage to these plants, especially to their sprouts. L. ingenua is the most common sciarid pest which damages

mushrooms in hothouses. In Ukraine it was massively recorded in cellars and on vegetables in storages. P. scabiei was recorded in Western Ukraine, except the Carpathians, as a potato pest species that damages sprouts in the fields and tubers in storages. Considering the absence of records of P. scabiei in natural biotopes of Ukraine, it is likely that this species was introduced to our country from America together with potatoes and should be recognized as an alien species to the natural entomofauna of Ukraine.

112. Panfilova A., Mohylnytska A. The impact of nutrition optimization on crop yield of winter wheat varieties (Triticum aestivum l.) and modeling of regularities of its dependence on structure indicators. *Agriculture and Forestry*. 2019. Vol. 65, Issue 3, Pp. 157-171. DOI: 10.17707/ AgricultForest.65.3.13.

The article presents the results of studies conducted in 2011-2016 years on the southern chernozem in the southern Steppe of Ukraine, studied the efficiency of processing winter wheat crops modern growth-regulating drugs in the main periods of vegetation of the crop on the background of mineral fertilizers application. It was determined that the introduction of pre-sowing cultivation of winter wheat fertilizer in a dose of N30P30 (background) and the use of foliar fertilizing of crops at the beginning of the resumption of spring vegetation and the beginning of stooling complex organic fertilizers Organic D2 and Escort-bio created favorable conditions for the formation of optimal indicators of the structure of the crop and, accordingly, a high level of grain yield of the studied varieties. In the variants of fertilizer Organic D2 and Escort-bio plants of winter wheat variety Kolchuga formed 4,42-4,48 t / ha of grain, and plants of Zamozhnist formed 4,96 – 4,99 t/ ha, which exceeded the control by 52,9 – 55,0 and 62,6-63,6%, respectively. From the studied varieties of winter wheat on a set of indicators, it was determined Zamozhnist as the best variety.

113. Shebanin V., Atamanyuk I., Kondratenko Y., Volosyuk Y. Development of the mathematical model of the informational resource of a distance learning system. *Advances in Intelligent Systems and Computing*. 2019. Vol. 836. P. 199-205. DOI: 10.1007/978-3-319-97885-7_20.

Analysis of the existing models of knowledge representation in informational systems allowed to make a conclusion about considerable advantages of combined network models, which are able to take into account indistinct content of some information. That's why the semantic network that differs from the well-known ones by the peculiarities stated in this article is accepted as a mathematical model of informational resource of a distance learning system.

114. Solesvik M., Kondratenko Y. P., Atamanyuk I., Borch O. Formal Concept Analysis for Partner Selection in Collaborative Simulation Training. *Studies in Systems, Decision and Control*. 2019. Vol. 203. P. 325-337. DOI: 10.1007/978-3-030-21927-7_15.

In this paper, we propose to apply formal concept analysis (FCA) technique to partner selection for joint simulator training. Simulator training is an important tool for preparation of seafarers in a classroom. However, the costs to acquire simulator centers is high. That is why the educational institutions and centers can only afford limited number of simulators. Though the price for simulator classes are quite high, it still more advantageous to train sailors in class than offshore. New cloud-based technologies allow to connect simulators situated in different places, including cross-country communication. This makes it possible to carry out joint training of different simulator types. In the study, we elaborate the approach of formal concept analysis is used to facilitate partner selection from the pool of potential collaborating institutions.

115. Vinarski M.V., Kramarenko S.S. Scale-dependence

in geographic variation in a freshwater gastropod across the Palearctic. *Molluscan Research*. Vol. 39, Issue 2. P. 159-170. DOI: 10.1080/13235818.2018.1497570.

The reality of spatial clinal variation in morphological traits of freshwater pulmonate snails (Gastropoda: Pulmonata) has repeatedly been questioned or totally discounted. There is a lack of sound statistical evidence in the articles hitherto published on this subject supporting these claims. Here, by means of different analytical methods (analysis of spatial autocorrelation, linear regression analysis, canonical correlation analysis and others), we demonstrate that shell variation in the dwarf pond snail, Galba truncatula, is patterned in space throughout the northern and central Palearctic, with latitudinally-oriented clines in body size and in some shell proportions. Shell size in G. truncatula decreases with latitude and temperature, representing a special case of converse Bergmann cline. However, the temperature itself is hardly the main driver of shell size variation. It is argued that the shorter growing seasons at high latitudes may represent a better explanation for the observed trend. Shell proportions in the dwarf pond snails vary weakly at the macrogeographic scale, being spatially patterned at lower (mesogeographic) scales around 1200–1500 km. In general, spatial variation in G. truncatula shell size is decoupled from variation in shell shape, demonstrating clear scale-dependence similar to that found in different species of terrestrial (non-aquatic) pulmonate snails.

Праці науковців МНАУ у наукометричній базі даних Web of Science

2000 рік

116. Chernov V. Y. Fracture of welds in gas and petroleum mains. *Materials science*. 2000. Vol. 36, Issue 3. P. 477-479. DOI: 10.1007/BF02769616.

2002 рік

117. Chernov V. Y. Evaluation of the corrosion resistance of pipes made of carbon low-alloy steels. *Materials science*. 2002. Vol. 38, Issue 1. P. 132-135.

118. Chernov V. Y., Makarenko V. D., Kryzhanivs'kyi E. I., Shlapak L. S. On the causes of corrosion fracture of industrial pipelines. *Materials science*. 2002. Vol. 38, Issue 6. P. 880-883. DOI: 10.1023/A:1024224204487.

It is established that the most active corrosion components in gas-water-oil environment are hydrogen sulfide, carbon dioxide, oxygen, and mineral salts (especially chlorides). The main types of corrosion fracture of the metalware of oil and gas objects, in particular, industrial pipelines, exploited under severe climatic conditions, are static and cyclic hydrogen fatigue, sulfide cracking, and local (pitting and groove) corrosion.

2003 рік

119. Chernov V. Y., Makarenko V. D., Kryzhanivs'kyi E. I., Shlapak L. S. Causes and mechanisms of local corrosion in oil-field pipelines. Materials science. 2003. Vol. 38, Issue 5. C. 729-737. DOI: 10.1023/A:1024274726352.

We study the causes and reveal the mechanism of local corrosion of carbon steels in the presence of high amounts of

water in the extracted oil, present the results of evaluation of the index of activity and the quantitative level of infection of oil-field pipelines with microorganisms, and consider the mechanism of development of corrosion damage to the body of the pipe in the form of pitting. The most probable chemical reactions of local corrosion are analyzed.

120. Makarenko V. D., Petrovs'kyi V. A., Chernov V. Y. Mechanism of hydrogen delamination of pipe steels of oil and gas pipelines. *Materials science*. 2003. Vol. 39, Issue 6. P. 895-900. DOI: 10.1023/B:MASC.0000031657.38517.0f.

We propose a mechanism of hydrogen delamination of pipe steels of oil and gas pipelines and study the influence of nonmetallic inclusions and hydrogen on the initiation of microcracks playing the role of nuclei of delamination of pipe steels.

2004 рік

121. Popov V. N., Kramarenko S. S. Dispersal of land snails of the genus Xeropicta monterosato, 1892 (Gastropoda; Pulmonata; Hygromiidae). *Russian journal of ecology*. 2004. Vol. 35, Issue 4. P. 263-266. DOI: 10.1023/B:RUSE.0000033797.51636.83.

Data on the parameters of migration of two land snails of the genus Xeropicta are presented. In relatively homogeneous habitats, the locomotor activity of these mollusks is relatively high: they can travel for up to 300 cm per day, with neither the phenotype nor size of the shell having any significant influence on the level of dispersal. The snails prefer to travel westward and southward, but the distances covered by individuals moving in different directions are similar. No connection between the directions or distances of movement on two successive days has been observed.

2007 рік

122. Kramarenko S. S., Khokhutkin I. M., Grebennikov M. E. Specific features of phenetic structure of the terrestrial snail Cepaea vindobonensis (Pulmonata; Helicidae) in urbanized and natural populations. *Russian journal of ecology*. 2007. Vol. 38, Issue 1. P. 39-45. DOI: 10.1134/S1067413607010079.

The phenetic structure of natural and urbanized populations of the terrestrial snail Cepaea vindobonensis has been studied with respect to polymorphism in the shell-band color and pattern. It is noted that C. vindobonensis snails populating different artificial habitats in the city of Nikolaev and its suburbs are characterized by a higher level of both intra- and interpopulation diversity with respect to the type of this polymorphism. In addition, urban populations show a very wide range of variation in the frequencies of particular morphs or their groups. Conversely, natural populations are characterized by a more uniform frequency structure with respect to polymorphism of the shell banding pattern.

2008 рік

123. Vakhonina L. V., Popov V. G. Flexural vibrations of a thin circular elastic inclusion in an unbounded body under the action of a plane harmonic wave. *International applied mechanics*. 2008. Vol. 44, Issue 5. P. 493-497. DOI: 10.1007/s10778-008-0061-y.

The interaction of a plane harmonic longitudinal wave with a thin circular elastic inclusion is considered. The wave front is assumed to be parallel to the inclusion plane. Since the inclusion is thin, the matrix-inclusion interface conditions (perfect bonding) are formulated on the mid-plane of the inclusion. The bending displacements of the inclusion are determined from the bending equation for a thin plate. The problem is solved using discontinuous Lamé solutions for harmonic vibrations. Therefore, the problem can be re-

duced to the Fredholm equation of the second kind for a function associated with the discontinuity of normal stresses on the inclusion. The equation obtained is solved by the method of mechanical quadratures using Gaussian quadrature formulas. Approximate formulas for the stress intensity factors are derived. Results from a numerical analysis of the dependence of the SIFs on the dimensionless wave number and the stiffness of the inclusion are presented.

2009 рік

124. Vakhonina L. V., Popov V. G. Interaction of harmonic axisymmetric waves with a thin circular absolutely rigid separated inclusion. *Mechanics of solids*. 2009. Vol. 44. Issue 2. P. 294-302. DOI: 10.3103/S0025654409020150.

We study stress concentration near a circular rigid inclusion in an unbounded elastic body (matrix). In the matrix, there are wave motions symmetric with respect to the axis passing through the inclusion center and perpendicular to the inclusion. It is assumed that one of the inclusion sides is completely fixed to the matrix, while the other side is separated and the conditions of smooth contact are realized on that side. The solution method is based on the fact that the displacements caused by waves reflected from the inclusion are represented as a discontinuous solution of the Lamé equations. This permits reducing the original problem to a system of singular integral equations for functions related to the stress and displacement jumps on the inclusion. Its solution is constructed approximately by the collocation method with the use of special quadrature formulas for singular integrals. The approximate solution thus obtained permits numerically studying the stress state in the matrix near the inclusion. Technological defects or constructive elements in the form of thin rigid inclusions contained in machine parts and engineering structure members are stress concentration sources, which may result in structural failure. It is shown that the

largest stress concentration is observed near separated inclusions. Static problems for elastic bodies with such inclusions have been studied rather comprehensively [1, 2]. The stress concentration near separated inclusions under dynamic actions on the bodies has been significantly less studied even in the case of harmonic vibrations. The results of these studies can be found in [3, 4], where bodies with a thin separated inclusion were considered, and in [5], where the problem about torsional vibrations of a body with a thin circular separated inclusion was studied. The aim of the present paper is to study stress concentration near such an inclusion in the case of interaction with harmonic waves under axial symmetry conditions.

2010 рік

125. Kotykova O. I. Grounding and realization of land resources management principles as away to maintain stable development of land tenure. *Actual problems of economics*. 2010. Issue 103. P. 75-79. URL: https://apps.webofknowledge.com/full_record.do?product=WOS&search_mode=GeneralSearch&qid=16&SID=F4Mds5r54G8y9nLpZUW&page=1&doc=1.

The articles develop the general pattern for grounding and realization of the land resources management principles as away to maintain the stable development of the land tenure; the basic components of the pattern are shape-forming factors, types of principles, methods and mechanisms of these principles' realization.

2011 рік

126. Ikhsanov S. M., Lopushanska V. V. Markov chains application in forecasting of socioeconomic processes. *Actual problems of economics*. 2011. Issue 115. P. 259-267.URL: https://apps.webofknowledge.com/full_record.do?product=WOS&search_mode=General

Search&qid=11&SID=F4Mds5r54G8y9nLpZUW&page=1&doc=1.

2.The article offers a variant of applying stochastic models based on Markov chains for socioeconomic processes forecasting. Data on the structure of land resources in Ukraine is considered as an example. An optimization problem is formulated for estimation of transition probabilities matrix, and accuracy of estimation depending on the interval of accumulation is obtained by the method of Monte Carlo. Forecast for the land resources structure of Ukraine in 2010 with its accuracy estimation is presented.

127. Kramarenko S. S., Leonov S. V. Phenetic Population Structure of the Land Snail Helix albescens (Gastropoda, Pulmonata, Helicidae) in the Crimea. Russian *Journal of Ecology*. 2011. Vol. 42. Issue 2. P. 170-177.

The polymorphism of shell banding pattern has been studied in Crimean populations of the land snail H. albescens. The results show that snails from different regions of the Crimea are characterized by specific types of shell polymorphism, the differences between them concerning mainly the number of observed shell morphs rather than their occurrence frequency. In particular, the proportion of snails with darkly colored shells increases in relatively cool habitats. However, among the microevolutionary processes determining the type and degree of polymorphism in H. albescens populations, a major role is also played by stochastic genetic phenomena, because the species exists in semi-isolated colonies with low effective abundance and high risk of local extinction.

128. The chemical content of different energy crops / L. Poisa etc. *Environment, technology, resources, proceedings of the 8th international scientific and practical conference*. 2011. Vol. I. P. 191-196. URL: https://

apps.webofknowledge.com/full_record.do?product=WOS&search_mode=GeneralSearch&qid=13&SID=F4Mds5r54G8y9nLpZUW&page=1&doc=1.

The paper presents the data of gaseous and alkali elements in above-ground biomass of energy crops. The investigations objects were Phalaris arundinacea L., Populus nigra, Artemisia vulgaris, Sylphium perfoliatum, Sida hermaphrodita, Dactylis glomerata, Salix viminalis, Medicago sativia L. The aim of the research: to evaluate the amount of chemical elements in energy crops. Evaluating the energy crops it can be seen, that the most alkaline metals are contained in Sida hermaphrodita, and the least in Sylphium perfoliatum L.

2012 рік

129. Atamanyuk I. P., Kondratenko V. Y., Kozlov O. V., Kondratenko Y. P. The Algorithm of Optimal Polynomial Extrapolation of Random Processes. *Modeling and simulation in engineering, economics, and management*. *Lecture Notes in Business Information Processing*. 2012. Vol. 115. P. 78-87. URL: https://apps.webofknowledge.com/full_record.do?product=WOS&search_mode=General Search&qid=4&SID=F4Mds5r54G8y9nLpZUW&page=1&doc=1.

There are seasonal deficits during the year in the meat and dairy product markets that lead to an increase in consumer prices. The calculated coefficient of elasticity showed that prices increase by 0.05%, with a decrease in the monthly supply volumes of meat by 1%. The calculated coefficients of elasticity indicate that the consumer price index for drinking milk, cheese and butter increases by 0.24, 0.12 and 0.13%, respectively, and with a decrease in the production of milk raw materials by 1%.

2013 рік

130. Dubovenko K. V. Allowance for the interaction between the underwater electric discharge channel plasma and the shock wave reflected from the chamber's wall. *Surface engineering and applied electrochemistry*. 2013. Vol. 49. Issue 1. P. 28-35. DOI: 10.3103/S1068375513010031.

The numerical simulation of a spark discharge formed along the axis of a cylindrical chamber filled with water has been carried out in the magnetohydrodynamic approximation. The simulation results are compared with the data known from the literature. The analysis of the spatiotemporal distribution of the pressure and temperature in the discharge chamber has been performed with due account for the interaction between the shock waves excited by the spark discharge and reflected from the chamber's wall and the plasma channel.

2015 рік

131. Atamanyuk I., Kondratenko Y., Shebanin V., Mirgorod V. Method of Polynomial Predictive Control of Fail-Safe Operation of Technical Systems. *Proceedings of xiiith international conference - experience of designing and application of cad systems in microelectronics cadsm.* 2015. P. 248-251.

In this paper there was obtained a method of the assessment of the probability of fail-safe operation of technical systems in the future instants of time. The method is based on the algorithm for modeling a posteriori nonlinear random sequence of change of values of the controlled parameter which is imposed a limitation of belonging to a certain range of possible values. The probability of fail-safe operations is defined as the ratio of the number of realizations that fell in the allowable range to the total number of them, formed as a result of the numerical experiment. The realization of a posteriori random sequence is an additive mixture of optimal from the

point of view of mean-square nonlinear estimate of the future value of the parameter analyzed and of the value of a random variable, which can not be predicted due to the stochastic nature of the parameter. The model of a posteriori random sequence is based on the Pugachev's canonical expansion. The method offered does not impose any significant constraints on the class of random sequences analyzed (linearity, stationarity, Markov behavior, monotoneness, etc.).

132. Groza A. D. P-polarized Nonlinear Surface Polaritons Near the Surface of an Epsilon-Near-Zero Metamaterial with Saturable Permittivity: Threshold Cases. *Nonlinear optics quantum optics-concepts in modern optics*. 2015. Vol. 47, Issue 4. P. 247-254. URL: https://apps.webofknowledge.com/full_record.do?product=WOS&search_mode=GeneralSearch&qid=8&SID=C4iwmYywuJvJx9X1F7x&page=1&doc=7&cacheurlFromRightClick=no.

We study p-polarized nonlinear surface polaritons (NLSP) propagating along the interface of an epsilon-near-zero (ENZ) metamaterial with saturable nonlinearity and an optically linear ENZ medium. On the base of the exact solution of Maxwell's equations we investigate the relationship between the NLSP propagation constant and the NLSP energy flux for the systems where surface polaritons can not exist in linear approximation but can exist in nonlinear case. We show that the relationship depends considerably from the saturation level of metamaterial permittivity. The propagation constant variation is limited for the self-focusing and is unlimited for the self-defocusing case. In the both cases effect of saturation of nonlinear permittivity leads to higher values of the NLSP energy flux compared to the energy flux calculated in the frameworks of Kerr model.

133. Kramarenko O. M. The Development of Strategic Bank Lending Industries in the Context of Globalization.

Economy of Region. 2015. Vol. 3. P. 228-U377. DOI: 10.17059/2015-3-19.

It is shown that, in the context of globalization, improved credit support for strategic sectors of the economy (for example, shipbuilding) can be achieved through the creation of a banking consortium based around leasing. A dialectical method of resolution of system tasks is selected as the methodological approach. Methods used include: comparative cost analysis of the strategic lending industry supporting the formation and development of a banking consortium; integrated method at the condition modeling of making and implementation of a lease agreement, which allowed to accommodate the interests for both parties of such agreement; optimization method to select the conditions of a lease agreement; classification and analytical method to clarify the classification of lease. The study proved and developed a plan of creation a banking consortium, including options of interaction of such consortium with potential customers based on a lease agreement. The process of functioning of the lease agreement in order to optimize it for both a bank consortium-lessor and a lessee is modeled. The significant advantages of leasing compared to the traditional lending for both parties of leasing, especially when ensuring long-term projects are summarized. The results of the research can be applied in the strategic lending industries development and can reduce the level of banking risks. Applying the results of the research in the social aspect can maintain and increase the number of jobs including the banking sector. The value of the work leis in the fact that the author has developed a new approach to achive the credit support for strategic sectors of the economy through the creation of the banking consortium based around leasing, which allows to protect the interests of both parties.

134. Shebanina O. Staffing for innovation and investment development of agro-industrial complex. *Management theory and studies for rural business and infrastructure devel-*

opment. 2015. Vol. 37, Issue 2. P. 275-285. DOI: 10.15544/mts.2015.25.

A modern level of preparation of specialists is the basic condition of possibility for innovative development and economy growth of agro-industrial complex. Exceptionally new connections between a production, science and education are in high demand. The system of regional higher agrarian universities must perform as a generator of innovative scientific ideas and as a realization of innovative-investment projects for development. The analysis of agrarian science potential is conducted and priority industries of investments for peopleware are set. By means of expert method the system of estimation of personnel in agrarian field has been worked out and shaped that takes into account two constituents - intellectual and labour. Each employee except professional qualities must have a capacity for the innovative thinking. The new approaches to the personnel selection will allow activating innovative activities of enterprises.

135. Vinarski M. V., Kramarenko S. S. How does the discrepancies among taxonomists affect macroecological patterns? *A case study of freshwater snails of Western Siberia. Biodiversity and conservation*. 2015. Vol. 24, Issue 8. P. 2079-2091. DOI: 10.1007/s10531-015-0934-4.

From the point of view of biogeographers and ecologists, taxonomy is not only a means of ordering life but also a source of some problems able to impede the progress in studies of large-scale patterns of biological diversity. Discrepancies among systematists caused, inter alia, by their different views on the species concept and criteria for species delineation, are commonly thought to provoke errors and misinterpretations in macroecological inferences. In this study, we discuss a case of freshwater gastropods of Western Siberia. Two systematic frameworks, developed in Western Europe and Russia and drastically different in number of accepted genera and species, were proposed to classify the Palearctic aquatic snails. Having compared two sets

of diversity data generated on the basis of the two systematic frameworks, we found that their parameters do not differ significantly. Such patterns as latitudinal gradients in total species richness, portion of branchiate snail species, and portion of species of non-European origin proved to remain the same, irrespective of which taxonomic approach, Western European, or Russian, is accepted. The absence of reliable changes in macroecological patterns may be explained by nearly consistent "splitting effort" applied by the Russian taxonomists in their revision of different families of aquatic snails. Thus, though the European and the Russian systematic frameworks differ significantly in number of accepted species, the large-scale patterns of diversity based on the two approaches are qualitatively the same.

136. Zhorova A, Kalyuzhna O. Infromative and consultative guidance of ukrainian agro-industrial complex management. *Management theory and studies for rural business and infrastructure development*. 2015. Vol. 37, Issue 2. P. 345-353. DOI: 10.15544/mts.2015.31.

Modern Ukrainian agro industrial production needs some new methods of management. The governing principle is proportionality of the type and scale of consultation to the potential impacts of the proposal or decision being taken, and thought should be given to achieving real engagement rather than merely following bureaucratic process. Consultation forms part of wider engagement and decisions on whether and how to consult should in part depend on the wider scheme of engagement. The purpose of the study is to extend the theoretical justification and organizational and methodological foundations of the agrarian producers' guidance. The essence and the need for the informative and consultative guidance are revealed. The ways of informative and consultative agrarian system's guidance improvement are developed. The paper proposes the priority of advisory services' development is given.

137. Zhorova A. N., Kozlova L. G., Mulenko I. A., Homkin A. L. Virial Coefficients for Thermodynamic Systems with Hill Pseudopotential. *Journal of Nano- and Electronic Physics*. 2015. Vol. 7, Вип.1.1037-1. URL: https://apps.webofknowledge.com/full_record.do?product=WOS&search_mode=GeneralSearch&qid=8&SID=C4iwmYywuJvJx9X1F7x&page=1&doc=3&cacheurlFromRightClick=no.

Temperature dependences of the 2-nd, 3-d and 4-th virial coefficients for chemically aggressive environments are analyzed. Their calculation is performed for several different pair interaction potentials and built on them Hill pseudopotentials. Use of a pair Hill pseudopotential, limiting the scope of the phase space available for the classical motion of free particles, allows to extend the domain of convergence of the virial temperature of decomposition.

2016 рік

138. Bezpiata I. Analysis of agrarian sector resource providing in Ukraine. *Baltic journal of economic studies.* 2016. Vol. 2, Issue 3. P. 4-9. DOI: 10.30525/2256-0742/2016-2-3-4-9.

The aim of this article is an analysis of material well-being level in agrarian sector of economy by productive resources (by land, labour, hardware) providing with that provides efficiency of economic activity and ground of basic directions of the rational bringing in and use of resource potential of agrarian sector of economy in Ukraine in market conditions. Research methodology consists in the use of statistical and economic research methods for analysis of productive resources using modern state of agriculture for period from 2010 to 2014 years. Research results show that the resource providing agrarian sector development can be defined as totality of certain types of resources (land, techno-

logical, labour, financial) and sources of their forming, directly participating in the processes of agrarian sector economies development that can be mobilized with the purpose of providing the scale using of their potential possibilities and transition of agriculture to the qualitatively new state. Analysis of the modern state of material well-being of agrarian sector resources of economy in Ukraine is unsatisfactory and with every year gets worse. To overcome this problem agricultural commodity producers are unable only by themselves. For the improvement of the economic state of agrarian sector of economy in whole country and regional state support of home agricultural producer, stimulation of his activity is needed. And first of all the self-weighted investment policy of the state should become such measures in the agrarian sector of economy that will allow bringing in of greater amount of investment resources for the improvement of technical equipment at agricultural enterprises, development of production co-operation and products sale, introduction of personnel management modern methodology, increase in labour activity level in agrarian sector, realization of the permanent updating and increase in products quality control, etc. Practical value. Got results in the process of research can be drawn on in practical activity of agricultural commodity producers, management organs at regional and national level on increasing of resource potential using efficiency in agrarian sector of economy. Value/originality. Research results allow defining basic directions for increasing of resource potential using efficiency in agrarian sector of economy. One of terms of efficiency introduction, competitive and high-performance agricultural production is investment activity that is sent to financing of the projects and programs, related to development of agrarian economy sector. Investment activity is based on investment policy of the state, clear legislative field, set priorities and directions and sent to forming of effective management mechanism by investments, creation of economically advantageous terms that would stimulate

stock accumulations and its effective use, taking into account realities and specific of agrarian economy sector.

139. Bezpyata I. Investment policy of ukraine in the agricultural sector. *Baltic journal of economic studies.* 2016. Vol. 2., Issue 1. P. 11-17. DOI: 10.30525/2256-0742/2016-2-1-11-17.

The aim of this article is a study of features of investment politics of the state in the agrarian sector of economy, determination of basic problems of bringing in of investments and grant of suggestions how to form the investment politics in the agrarian sector of economy in Ukraine. One of the issues in agrarian sector of economy development in Ukraine is providing of agriculture necessary financial and material resources the basic source of that are investments. Presently Ukraine is in an investment crisis that is characterized by the decline of investment activity of management subjects because of the low level of investor's activity. Reason of that is an unfavourable investment climate in a country that was appeared because of unstable position of country and risky economic position. Agriculture is a food industry of national economy her state depends on the facilities inlaid in her development, namely - from intensity of investment activity. Exactly active government investment activity in an agrarian sector is the mortgage of his stable development and effectiveness. Research methodology consists, that the reason of agricultural production crisis, foremost, because of government control and agroindustrial complex support weakened role. In the developed countries, vice versa, the value of state support of agroindustrial complex increases. Charges on agrarian politics realization as a line and indirect support grow constantly, as it demonstrates the hands-on experience in EU. The general chart of government control of investing terms levers in the agrarian sector of economy is certain by us. The results of research is showing that an important condition necessary for private capital investments (both foreign and domestic) is a permanent and well-

known set of the norms and rules, set in the way that potential investors could understand and foresee that these rules will be used to their activity. Practical value is certain by success of investment projects that depend on the openness of government and local self-government bodies, from a dialogue with public and productive sphere (agribusiness). A value/ originality. Research results allow defining basic obstacles in bringing in of investments in the agrarian sector of economy in Ukraine. Showing up: the high risks, related to the specific of agriculture (climatic terms, duration of productive process), ecological aspect and economic situation in a country on the whole; subzero investment attractiveness of industry and agrarian enterprises, undeveloped infrastructure; high level of lending rates of commercial banks; unwithstand politics of state interference and adjusting, does not add the confidence for potential investors.

140. Kalinichenko A., Havrysh V., Perebyynis V. Evaluation of biogas production and usage potential. *Ecological chemistry and engineering s-chemia i inzynieria ekologiczna s.* 2016. Vol. 23, Issue 3. P. 387-400. DOI: 10.1515/ eces-2016-0027.

The aim of the research is the development of theoretical and methodical bases for determining the feasibility of plant raw materials growing for its further bioconversion into energy resources and technological materials to maximize profit from business activities. Monograph, statistics, modelling and abstract logical methods have been used during the research. Directions of biogas usage have been examined. Biogas yields from different crops have been analyzed. It has been determined that high methane yields can be provided from root crops, grain crops, and several green forage plants. So, forage beet and maize can provide more than 5,500 m3 of biogas per hectare. Attention is paid to the use of by-products of biogas plants, especially carbon dioxide. Carbon dioxide is an important commodity and can increase profitability of bio-

gas plant operating. It can be used for different purposes (food industry, chemical industry, medicine, fumigation, etc). The most important parameters of the biogas upgrading technologies have been analyzed. If output of an upgrade module is more than 500 nm(3)/h, investment costs of different available technologies are almost equal. According to experts, it is economically feasible to use anaerobic digestion biogas systems to upgrade biomethane provided their performance is equivalent to 3,000 litres of diesel fuel per day. The economic and mathematical models have been suggested to determine the feasibility of growing plant materials to maximize the gross profit. The target function is the maximum gross income from biogas utilization. It has the following limitations: annual production of biogas, consumption of electricity, heat and motor fuels. The mathematical model takes into account both meeting own requirement and selling surplus energy resources and co-products including carbon dioxide. In case of diesel fuel substitution, an ignition dose of diesel fuels has been considered. The algorithm for making a decision on construction of a biogas plant has been offered.

141. Poisa L., Bumane S., Cubars E., Antipova L. Hemp quality parameters for bioenergy-impact of nitrogen fertilization.*15TH international scientific conference: engineering for rural development.* Jelgava, latvia. 2016. P. 928-933.

The aim of the research - to evaluate the nitrogen fertilizer rate impact on the energetic parameters of hemp. The nitrogen fertilizer rate effect on the hemp ash content depends on the hemp variety: for the local variety "Purini", with the increase of the nitrogen fertilizer rate, the ash content decreases, while for the variety "Bialobrzskie" - it is the opposite - increasing the nitrogen fertilizer rate, the ash content increases. Change of the nitrogen fertilizer rate from N-0 to N-100 increased the resulting thermal capacity from one hectare. In this research it was observed that a higher ther-

mal capacity has a positive (p < 0.001) connection with the harvest yield amount. For the sown hemp the nitrogen rate variation increased the thermal energy amount from one hectare for shives by 73 % ("Purini") and 31 % ("Bialobrzskie"), for the stalks by 66 % ("Purini") and 36 % ("Bialobrzskie"). The highest determined thermal capacity for hemp was 171.71 +/- 18.31 GJ.ha(-1).

142. Poltorak A., Volosyuk Y.Tax risks estimation in the system of enterprises economic security. *Economic annals-XXI*. 2016. Vol. 158, Issue 3-4, Ч. 2. С. 35-38. DOI: 10.21003/ea.V158-08.

One of the aspects which characterises the quality and reasonableness of managerial decisions at the enterprises is the determination of their positions concerning the complex of risks in the field of entrepreneurship, including tax risks. In conditions of fast reforming of the Ukrainian taxation system and the valid legislative and regulatory framework, the potential for errors in the process of determination of tax bases and the incorrect definition of certain legislative standards increases. It contributes to the appearance of tax risks and acuminates the problem of their estimation in the system of economic security of enterprises.

143. Population structure and genome characterization of local pig breeds in Russia, Belorussia, Kazakhstan and Ukraine (vol 48, pg 16, 2016) / Traspov A. etc. *Genetics selection evolution*. 2016. Vol. 48., 57. DOI: 10.1186/ s12711-016-0235-8.

144. Population structure and genome characterization of local pig breeds in Russia, Belorussia, Kazakhstan and Ukraine / Traspov A. etc. *Genetics Selection Evolution*. 2016. Vol. 48, 16. DOI: 10.1186/s12711-016-0196-y.

It is generally accepted that domestication of pigs took place in multiple locations across Eurasia; the breeds that origi-

nated in Europe and Asia have been well studied. However, the genetic structure of pig breeds from Russia, Belorussia, Kazakhstan and Ukraine, which represent large geographical areas and diverse climatic zones in Eurasia, remains largely unknown. This study provides the first genomic survey of 170 pigs representing 13 breeds from Russia, Belorussia, Kazakhstan and Ukraine; 288 pigs from six Chinese and seven European breeds were also included for comparison. Our findings show that the 13 novel breeds tested derived mainly from European pigs through the complex admixture of Large White, Landrace, Duroc, Hampshire and other breeds, and that they display no geographic structure based on genetic distance. We also found a considerable Asian contribution to the miniature Siberian pigs (Minisib breed) from Russia. Apart from the Minisib, Urzhum, Ukrainian Spotted Steppe and Ukrainian White Steppe breeds, which may have undergone intensive inbreeding, the breeds included in this study showed relatively high genetic diversity and low levels of homozygosity compared to the Chinese indigenous pig breeds. This study provides the first genomic overview of the population structure and genetic diversity of 13 representative pig breeds from Russia, Belorussia, Kazakhstan and Ukraine; this information will be useful for the preservation and management of these breeds.

145. Shebanin V., Atamanyuk I., Kondratenko Y., Volosyuk Y. Application of Fuzzy Predicates and Quantifiers by Matrix Presentation in Informational Resources Modeling. *XII International Conference on Perspective Technologies and Methods in MEMS Design (MEMSTECH)*. Lviv, Ukraine. 2016. C. 146-149. URL: https://apps.webofknowledge.com/full_record.doproduct=WOS&search_mode=GeneralSearch&qid= 4&SID=E4oLzvSr3p7n9mUbVPd&page=1&doc=6&cacheurlFromRightClick=no.

The techniques of informational resource structuring mathematic formalization, the process on information structuring

phases and the questions of fuzzy logic application at the phase of informational resources modeling are presented. The fuzzy predicates' logic in vector-matrix presentation application through fuzzy output receiving based on the rules articulated as the ratios between predicates is examined.

2017 рік

146. Baranovsky V. M., Skalsky O. J., Pankiv M. R., Pastushenko A. S. Chicory root crops combined harvester. *Inmateh-agricultural engineering*. 2017. Vol. 53. Issue 3. C. 41-50. URL: https://apps.webofknow ledge.com/full_record.do?product=WOS&search_mode=General Search&qid=18&SID=E4oLzvSr3p7n9mUbVPd&page=1&doc=1&cacheurlFromRightClick=no.

The stages of improvement, structure and modes of digging tools of root harvesters' transport-technology systems have been described in this paper. The main ways of improvement, development principles and construction algorithm of combined digging machine for chicory root crops harvesting have been considered on the basis of research objects identification (conventional types of diggers). It was found that the construction algorithm of chicory roots combined harvester functional design must be based on mono block technological-transport systems development where digging tools are supposed to perform related technological operations simultaneously, namely: preliminary and final root crops digging, their topping. The results of experimental researches, the regression equation describing the change in loss and damage chicory root crops depending on the parameters of the combined digger are presented. It is established that the condition providing generalized criteria (root crop loss less than 2.5%, root crop damage less than 15%) performed digger combined velocity of 1.5 m/s, rotational speed of the drive shaft 500 Rpm and depth of the ripper 16 cm.

147. Chornyy S., Poliashenko N. Determination of Soil-loss Tolerance for Chernozem of Right-Bank Ukraine. Soil science working for a living: applications of soil science to present-day problems. *Pedodiversity in Space and Time Symposium*. Chernivtsi Natl Univ, Chernivtsi, Ukraine. 2017. С. 109-119. DOI: 10.1007/978-3-319-45417-7_9.

Soil loss tolerance (T-value) is the maximum rate of soil erosion that may be tolerated and still allow high, sustainable crop yields. For modelling soil loss tolerance for Chernozem of the Right-Bank Steppe of Ukraine, a modified productivity index (MPI) is developed by summing productivity values of each 10 cm layer over the upper metre thickness of the soil. Productivity values depend on the content of humus, available phosphorus and potassium, bulk density, and pH. The equation is defined by the size of change in MPI over a given time and, also, the rate of decline of MPI in the topsoil caused by soil erosion. Calculations for eroded and not-eroded Ordinary chernozem and Southern chernozem under the condition of losing not more than 5% of soil fertility over 100 years indicate a soil loss tolerance of 5-7 t/ha/year.

148. Gamajunova V. Sustainability of Soil Fertility in the Southern Steppe of Ukraine, Depending on Fertilizers and Irrigation. Soil science working for a living: applications of soil science to present-day problems. *Pedodiversity in space and time symposium*. Chernivtsi Natl Univ, Chernivtsi, Ukraine. С. 159-166. DOI: 10.1007/978-3-319-45417-7_14.

Farming in the Southern Steppe of Ukraine is mining humus and nutrients. There comes a point when soil degradation is irreversible: sustainability requires complying with the fundamental laws of agriculture-in particular, sound crop rotation and return of nutrients to balance removal by the crops. Short-and long-term field experiments on typical Kastanozen and Chernozem reveal that provision of adequate

nutrients and water gives consistently high crop yields and these factors significantly change the main indicators of soil fertility: humus content, gross and moving content of NPK, and water-physical properties (as well as the content of arsenic and heavy metals). Combined use of organic and mineral fertilizers is the most effective way to stabilize crop yields and soil fertility; organic fertilizers stabilize soil structure which, in turn, enhances the infiltration of rainfall. Combined organic-mineral fertilizer in crop rotation increases the efficiency of water utilization on average by 20-30%, in very dry years by 30-40%.

149. Kajtoch L. Reconstructed historical distribution and phylogeography unravels non-steppic origin of Caucasotachea vindobonensis (Gastropoda: Helicidae). *Organisms diversity & evolution*. 2017. Vol. 17, Issue 3. C. 679-692. DOI: 10.1007/s13127-017-0337-3.

Existing data on the phylogeography of European taxa of steppic provenance suggests that species were widely distributed during glacial periods but underwent range contraction and fragmentation during interglacials into "warm-stage refugia." Among the steppe-related invertebrates that have been examined, the majority has been insects, but data on the phylogeography of snails is wholly missing. To begin to fill this gap, phylogeographic and niche modeling studies on the presumed steppic snail Caucasotachea vindobonensis were conducted. Surprisingly, reconstruction of ancestral areas suggests that extant C. vindobonensis probably originated in the Balkans and survived there during the Late Pleistocene glaciations, with a more recent colonization of the Carpatho-Pannonian and the Ponto-Caspian regions. In the Holocene, C. vindobonensis colonized between the Sudetes and the Carpathians to the north, where its recent and current distribution may have been facilitated by anthropogenic translocations. Together, these data suggest a possible non-steppic origin of C. vindobonensis. Further investigation may reveal

the extent to which the steppic snail assemblages consist partly of Holocene newcomers.

150. Kalinichenko A., Havrysh V., Perebyynis V. Sensitivity analysis in investment project of biogas plant. *Applied ecology and environmental research*. 2017. Vol. 15, Issue 4. C. 969-985. DOI: 10.15666/aeer/1504_969985.

The article shows the practical value of biogas as the second generation biofuel. All the projects dealing with biogas are subjected to external risks, such as the change of market condition, customer needs, governmental regulation, etc. In conditions of uncertainty it is necessary for administration to concentrate on decision-making. Fluctuations of sales volume, energy resources and raw material prices, etc. should be taken into account. Sensitivity analysis can predict the result of negative external phenomena. We developed the economic-mathematical model for the analysis of biogas complexes sensitivity. The profitability index as a criterion for the effectiveness of investment projects is a special feature in this model. The calculations show that biogas optimal distribution provides much larger gross income. We also suggested the methodology for sensitivity analysis implementation in investment projects for biogas complex creation. According to our calculations, the most stable project has utilization both biomethane (as motor fuel) and carbon dioxide. We demonstrate that the use of the profitability index as a criterion for an investment project gives higher critical values of input external factors, that endows assured profitability of an investment project.

151. Kotykova O., Albeshchenko O. An indication of the sustainable development of Ukraine in global dimensions. *Baltic journal of economic studies*. 2017. Vol. 3. Issue 5. C. 196-202. DOI: 10.30525/2256-0742/2017-3-5-196-202.

The urgency of the research. In the early 90s of the last century, economists and scientists attributed Ukraine to the undisputed leaders due to the existing resource potential and predicted its rapid economic growth. Unfortunately, the predictions have not come true: over the last 25 years, Ukraine has lost its advantages on certain indicators. As for the positions, which have been saved, Ukraine should pay the unreasonably high price by the ecological and social conditions deterioration. Target setting. The question is how the other countries have coped with these problems. Moreover, in our opinion, the most valuable experience is the experience of post-socialist countries, which had the same problems as Ukraine had like adaptation problems to the market environment. Recent scientific researches and issues analysis. The most authoritative foreign researchers on the sustainable development problems are Donella H. Meadows, G. Brundtland, M. Ashby, N. Droste, K. Fiorella and others. The most authoritative researchers on the sustainable development problems in Ukraine are Mykhailo Zghurovskyi and his project performers. Uninvestigated parts of general matters defining. However, these researchers did not conduct the investigations of indication of the sustainable development of Ukraine in comparison with the countries of post-socialist camp. The research objective. The survey target is a comprehensive study of Ukraine in the global dimension of sustainable development index: the implementation of post-socialist countries ranking placement in the indices of economic, social and environmental dimension, the index of a sustainability, the index of economic measurement and index of harmonization, the components of quality of life and safety of life; the analysis of placement in these spaces in order to find patterns and distinctive features for a particular group of countries; setting of the countries' placement features in the above mentioned spaces and the comparison of groups with Ukraine. The statement of basic materials. The article deals with the author's research results about Ukraine's place in

the sustainable development measuring global index. The valuation is performed by measuring metric indices of sustainable development in the space of three pillars (economic, environmental, and social) in the context of quality and safety of life. Conclusions. Performed the ranking of the post-socialist states' placement in the space of sustainable development index. The analysis of placement in these spaces in order to find patterns and distinctive features for a particular group of countries is made. Peculiarities of the placement in the abovementioned spaces are outlined, and the comparison of these groups with Ukraine is given.

152. Ksonzhyk I., Dubinina M. Monitoring of the activity of public procurement system in countries of european union and Ukraine. *Baltic journal of economic studies*. 2017. Vol. 3, Issue 5. C. 238-243. DOI: 10.30525/2256-0742/2017-3-5-238-243.

The research objective is to study and summarize the experience of the European Union countries in the field of public procurement monitoring; to study the activities that form its mechanism; to analyse forms of monitoring. Also, the current state, problems and prospects of creation and implementation of the mechanism for public procurement monitoring in Ukraine are studied; administrative and corruption risks are revealed. Methodology. Theoretical and methodological backgrounds of the research are formed on the basis of the provisions, categories, and concepts of economic theory, national and world economy, strategic development of public procurement, modelling. Laws and regulations that are regulators of the public procurement system and its monitoring, the works of domestic and foreign scientists on investigated issues were of greater importance. The system-structural analysis and synthesis, general scientific methods and methods of economic research are used to analyse and evaluate the phenomena and processes that accompany the functioning of the public procurement market and the

mechanism for its monitoring. In particular, historical and dialectical methods (when studying the development of public procurement system in Western countries, the definition of stages and trends in its formation, the development and adoption of treaties for the regulation of public procurement within the European Union); method of expert assessments (for assessing the regulatory and legal support for public procurement monitoring); abstractlogical method (when establishing the factors for the formation of a monitoring mechanism in the field of public procurement in Ukraine, in particular, the institutional and organizational-economic features of its implementation, when assessing the criteria and performance indicators for the functioning of the monitoring system and its impact on the public procurement market, for theoretical generalization and conclusions formation). Results. The results of the research showed that the system of public procurement in the member countries of the European Union and its monitoring processes are still in the process of reforming, despite being the most organized, open, and predictable in the world. At the same time in Ukraine, the process of developing and implementing a mechanism for monitoring public procurement is only a few years old. At the same time, the development of the field of public procurement and the mechanism for its monitoring is accelerating, which is conditioned both by the position of civil society and by the presence of significant corruption risks. Practical implications. The study of the experience of the public procurement monitoring system in the EU countries makes it possible to use the result (in the form of conclusions and generalizations) to adapt foreign monitoring instruments to the domestic realities of the public procurement market in order to achieve maximum effect in the form of budgetary savings. Value/ originality. Harmonization of the organizational and economic mechanism for public procurement and its monitoring in the countries of the European Union and Ukraine will provide a mutual opportunity for both foreign and domestic eco-

nomic entities to become full participants in the public procurement markets; will make procurement, conducted in Ukraine, clear and accessible to foreign participants.

153. Kushniruk V., Ivanenko T. Analysis of trends and prospects for development of export and import of goods and services by enterprises of Ukraine at the regional level. *Baltic journal of economic studies*. 2017. Vol. 3, Issue 5. C. 252-259. DOI: 10.30525/2256-0742/2017-3-5-252-259.

International economic relations at the level of export and import of goods and services have a significant impact on the development of the economy of each country. At the same time, the export of goods and services by enterprises of Ukraine at the regional level plays an important role, which is a source of significant inflow of foreign exchange funds, ensuring financial stability and investment attractiveness. The subject of the research is theoretical, methodological, and practical aspects of the development of foreign economic activity by enterprises of Ukraine at the regional level. The methodological basis of the study is the dialectical method of cognition and the basics provisions of economic science. The use of the system approach allowed considering the object and subject of research as a system and element of the general economic system. In the process of research, a number of methods are used, such as: abstract-logical, economic-statistical, monographic, and graphic. The purpose of the study is to analyse trends and prospects for the export and import of goods and services by enterprises of Ukraine at the regional level. The stated purpose led to the following tasks: conducting research on the volumes of export and import trade in goods and services; identification of factors influencing foreign trade; definition of geographical changes in the sphere of foreign trade and the coefficient of export coverage by import; substantiation of cooperation with foreign partners on a toll basis. According to the results of the research, the following conclusions

are obtained: trends and prospects of the export and import of goods and services are investigated; it is found that the low competitiveness of national industrial products, the crisis financial situation of most industrial enterprises, the lack of development of national certification systems and quality control of export goods, the low world rating of Ukraine's reliability for loans and investments affects foreign trade; a significant expansion of the geography of export trade and import supplies is revealed, which positively influenced the balance of foreign trade in goods and services. Therefore, in order to build a highly efficient national economy, the foreign economic activity of Ukrainian enterprises at the regional level should be oriented towards the development of export of finished products, rather than raw materials and partial import substitution for those products that can be successfully produced in Ukraine. The process of import substitution solves a range of socio-economic tasks, such as the revival of the agro-industrial complex, the reduction of unemployment, and the strengthening of the country's economic security. At the same time, the modernization of agrarian and industrial enterprises can take place at the expense of foreign exchange earnings from export.

154. Piurenko I., Banyeva I., Garkusha O. Dynamics factors of ukrainian economy innovative transformation: main points and specifics of influence. *Marketing and management of innovations*. 2017. Issue 4. C. 272-282. DOI: 10.21272/mmi.2017.4-24.

Innovative economy development factors are researched in this article. It is stated that the main factors assisting in development of Ukrainian innovative economy are internal current expenditures on technical scientific developments, scientific services and applied researches, performed by scientific organizations on their own. It is scientifically proved that the following items should be attributed to the list of urgent measures of the state innovative policy: fighting corruption

intensification, political stabilization, strengthening of the Ukrainian Antimonopoly Committee role and responsibility for violation of Ukrainian antimonopoly legislation, increasing the intellectual property protection level and copyright up to international standards, increasing targeted state financing of scientific institutions, which produce innovative developments, demanded by the real economy sector, state development and private pilot projects of high-tech industrial parks based on leading domestic scientific institutions of respective profile.

155. Potryvaieva N., Aheienko I. Estimation of the modern state of provision of agricultural enterprises in mykolaiv region by material and technical resources. *Baltic journal of economic studies*. 2017. Vol. 3, Issue 4. C. 224-230. URL: https://apps.webofknowledge.com/full_record.do?product=WOS&search_mode=GeneralSearch&qid=18&SID=E4oLzvSr3p7n9mUbVPd&page=1&doc=9&cacheurlFromRightClick=no.

The research considers the issue of the provision of agrarian enterprises in Ukraine by material and technical resources and effective use of them. The scientific novelty of the results obtained is in the research of theoretical positions, substantiation of applied approaches concerning the organization of material and technical provision of enterprises of the agrarian sector, in particular, Mykolaiv region, taking into account the proposals of the second market of agricultural machinery, units, and aggregates. Methodology. The purpose of the article is the research and estimation of the current state of the provision of agrarian enterprises by material and technical resources. The object of scientific research is the process of provision of material and technical resources for enterprises of the agrarian sector in Mykolaiv region. The level of material and technical resources at agricultural enterprises in Mykolaiv region is analysed. Relative improvement of the situation with techni-

cal equipment and energy supply of agriculture in the Mykolaiv region since 2014 is defined; however, the dynamics are not active sufficiently and do not exceed five percent. The ratio between the amount of machinery purchased and disposed of by depredation is disproportionate, the equipment provided by the unit of area, and the load on the machines available in the farms do not meet the requirements. The dynamics of capital and direct foreign investments in agriculture of Mykolaiv region, which during the research period increased, is investigated. It is proved that despite the rather successful development of capital investments by large-scale agricultural producers in the region, financial investments in modernization, repair, and acquisition of the new technology by small business entities are not sufficiently active. The authors substantiate that the tasks of technical re-equipment for commodity producers of the Mykolaiv region remain one of the most important, the search for prospective ways of its renewal is urgent. In particular, the authors proposed to intensify the formation of the secondary market of restored agricultural machinery based on the experience of foreign countries. Progressive improvement of material and technical resources is seen in the development of a network of local leasing funds and funds of preferential lending to agricultural commodity producers; expansion of cooperative forms of acquisition and exploitation of high-tech; the growth of dealer centres that provide rural commodity producers with equipment on leasing terms. In the conclusions, it is proved that the reduction of the number of the main types of equipment at agricultural enterprises in Mykolaiv region led to the fact that most of the technics are used longer the normative lifetime, on-load for each type of equipment is constantly increasing due to its scarcity. Improvement of the efficiency and growth of agricultural production and the level of its intensification needs updating of the material and technical base of agricultural enterprises, which requires significant investments. Taking into account the implementation of the

region targeted programs, the role of public authorities is to develop measures aimed at a comprehensive solution to problems related not only to the implementation of technical, investment, and innovation policies but also to the coordinated co-operation between the industrial, commercial, and financial strategy.

156. Shebanin V., Atamanyuk I., Kondratenko Y., Volosyuk Y. Canonical Mathematical Model and Information Technology for Cardio-Vascular Diseases Diagnostics. *14th international conference: the experience of designing and application of cad systems in microelectronics (CADSM)*. Svalyava, Ukraine. 2017. C. 438-440. URL : https://apps.webofknowledge.com/full_record.do?product=WOS&search_mode=GeneralSearch&qid=4&SID=D4ZpHW5pwWcvxBfSUun&page=2&doc=12&cacheurlFromRightClick=no.

This paper is devoted to the development of mathematical model and information technology for computer analysis of medical diseases based on investigations of cardiograms. Authors propose to use cardiogram recognition algorithm which is synthesized on the mathematical base of nonlinear canonical decomposition of random sequence. The automation process of cardiograms recognition, analysis, classification and decision-making is described in details for the diagnosis of cardio-vascular diseases. The proposed approach can be applied in medical hospitals and clinics for increasing efficiency of medical diagnostics, including decreasing time and rising accuracy of information processing.

157. Shelyov A. V., Kopylov K. V., Kramarenko S. S., Kramarenko O. S. Analysis of population-genetic processes in different cattle breeds by microsatellite loci of dna. *Agricultural science and practice*. 2017. Vol. 4, Issue 1. C. 74-78. DOI: 10.15407/agrisp4.01.074.

The aim of our research was to analyze the population-genetic processes in different dairy breeds using highly polymorphic molecular and genetic markers (DNA microsatellites). Methods. We used 10 loci recommended by the International Society for Animal Genetics (ISAG) to analyze 88 DNA samples of the two most abundant dairy breeds of cattle in Ukraine Ukrainian red-motley dairy and Ukrainian black-and-white dairy breeds. The formulas, linking the expected disequilibrium (LD) of adherence to the effective population size (Ne) were used. Results. The work presents the results of the study on genetic processes in the populations of Ukrainian red-and-motley breed using 10 microsatellite loci of DNA. It was shown that, being highly polymorphic multilocus genetic systems, microsatellites of DNA are highly informative markers of population-genetic processes, occurring in the populations of cattle. Conclusions. The studied populations of Ukrainian dairy cattle breeds arc impacted by population-genetic and genetic-automatic processes. In particular, the effect of the latter on Ukrainian red-and-motley dairy breed was noted. These animals had notable significant loss of rare alleles and the manifestation effect of "bottle neck". The values obtained testify to a low level of inbredness in these populations. The efficient size of populations in the studied Ukrainian dairy cattle breeds was estimated in the approximate range of 397-555 heads which testified to a favorable condition of the population of Ukrainian red-and-motley dairy cattle and a critical condition of the Ukrainian black-and-white dairy breed.

158. Stavinskii A., Vakhonina L., Sadovoy O., Saravas V. Weight-to-price Indicators of Electromagnetic Systems Single-Phase Transformers and Reactors with Twisted Magnetic Circuits. *2017 international conference on modern electrical and energy systems (mees)*. Kremenchuk Mykhailo Ostrohradskyi Natl Univ, Kremenchuk, Ukraine. 2017. C. 172-175. URL: https://apps.webofknowledge.

com/full_record.do?product=WOS&search_mode= GeneralSearch&qid=18&SID=E4oLzvSr3p7n9mUbVPd&page=1&doc=3&cacheurlFromRightClick=no.

New technical proposals for improvement by changing the configuration and position in the space of active elements in order to reduce the material capacity and increase the reliability of single-phase transformers and reactors are presented. Based on mathematical models with partial or integral optimization criteria and a set of independent and dependent control variables, the optimal mass and cost parameters of single-phase electromagnetic systems variants that differ in the structure and configuration of the active elements are determined.

159. Stavinskiy A., Plakhtyr O., Tsyganov A., Stavinskiy R. Possibilities of Improving the Transformers and Reactors on the Basis of Multiple Counters of the Rods. *International Conference on Modern Electrical and Energy Systems (MEES)*. Kremenchuk Mykhailo Ostrohradskyi Natl Univ, Kremenchuk, Ukraine. 2017. C. 176-179. URL: https://apps.webofknowledge.com/full_record.do?product=WOS&search_mode=GeneralSearch&qid=18&SID=E4oLzvSr3p7n9mUbVPd&page=1&doc=4&cacheurlFromRightClick=no.

Technical solutions of transformers and reactors improvement by structural conversion of the elements of the active part are considered. Such conversion consists in the replacement of the traditional circular forming contours of the rods and winding coils by hexagonal and octagonal configurations. The decrease of material consumption and labor intensity of production as well as the increases of electrodynamical stability of the mentioned induction static devices are achieved.

160. Syrtseva S., Melnyk O. Infrastructure activation of innovative development of Ukrainian agrarian sector. Bal-

tic journal of economic studies. 2017. Vol. 3, Issue 5. C. 400-406. DOI: 10.30525/2256-0742/2017-3-5-400-406.

The purpose of the paper is a justification of roles and identifying areas of improving the functioning of innovation infrastructure that will boost innovation in the agricultural sector of Ukraine. Methodology. The methodical basis of the study consists of general scientific cognition methods of economic phenomena and processes. Realization of the work tasks required such methods: theoretical generalization method - during study of scientific papers, legislative and regulatory acts; abstract logical method - to summarize theoretical and methodological provisions, as well as define the research goal; system approach method - identifying areas for improving the functioning of the innovation infrastructure of Ukrainian agrarian sector. Results. Found that in modern development conditions, a network of innovative structures that would provide infrastructure support for innovation development in the agricultural sector should be represented by such institutions as: agricultural innovation clusters, science parks, business incubators, venture funds, advisory services. Taking into account the international experience of the main institutions of infrastructural maintenance of innovative development, suggested areas of improvement and optimization of their formation and functioning to ensure innovation in the agricultural sector of Ukraine. Proved that the formation of agricultural innovation regional clusters should be represented by the following stages: a preliminary analysis and identifying promising areas and productions; selection of the cluster members; the strategic planning stage; setting goals and objectives; work scheduling of the cluster members in order to implement strategies; control over the execution of the approved programs and projects. Taking into account the global model of organization of advisory services, determined that the development of agricultural advisory system should be implemented through extension services, organized at the

agricultural universities that provide links with rural youth, agricultural enterprises, and scientific organizations. Proved, that two groups of methods - direct and indirect - should represent the most important directions of the state policy on the development of venture investments of innovative development of the agricultural sector. Value/ originality. The formation and functioning of the optimal system of institutes of innovation infrastructure with the help of appropriate tools and methods will promote the active introduction of innovations in the agrarian sector of the economy and bring it to a qualitatively new level of development.

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161. Artificial Croplands and Natural Biosystems in the Conditions of Climatic Changes: Possible Problems and Ways of their Solving in the South Steppe Zone of Ukraine / Vozhehova R. A. etc. *Research journal of pharmaceutical biological and chemical sciences*. 2018. Vol. 9., Issue 6. C. 331-340. URL: https://apps.webofknowledge.com/full_record.do?product=WOS&search_mode=GeneralSearch&qid=13&SID=D4ZpHW5pwWcvxBfSUun&page=1&doc=3&cacheurlFromRightClick=no.

The goal of our study was to determine possible consequences and trends of the climatic changes in the South Steppe zone of Ukraine. We used perennial meteorological data from Kherson regional hydro meteorological station and, international meteorological indexes for assessment of the climate processes. The evapotranspiration in the region in the period from 2005 to 2016 averaged to 4:3 mm/ha per day. We determined that evapotranspiration increase under the progressive air temperatures rise cannot be covered at the expense of natural humidification, although rainfall amounts are tending to increase too. The moisture deficit reached the maximum value of 680 mm/ha per season in

2014. Regression models of the climatic processes of the zone showed stable trend to increase of dryness (from 462 mm/ha of the moisture deficit in 2005 to 502 mm/ha in 2016, correspondingly). Global warming will effect not only on the artificial croplands, but it threatens sustainability of the natural biosystems, especially, natural grasslands and forests. Climatic changes in Kherson region should be taken into account while planning sustainable crop production and maintaining biosystems diversity in the region. Application of the modern irrigation methods of the artificial croplands and pastures are the priority direction of agricultural production in the zone.

162. Atamanyuk I., Shebanin V., Volosyuk Y., Kondratenko Y. Generalized Method for Prediction of the Electronic Devices and Information Systems' State. *14th International Conference on Perspective Technologies and Methods in MEMS Design (MEMSTECH)*. Svalyava, UKRAINE. 2018. С. 91-95. URL: https://apps.webofknowledge.com/full_record.do?product=WOS&search_mode=GeneralSearch&qid=3&SID=F5UUjRSYjDRtluuzYSb&page=3&doc=28&cacheurlFromRightClick=no.

Generalized nonlinear method of the prediction of the state of electronic devices and information systems provided that the parameters of the devices are measured with errors is offered. Filter-extrapolator is synthesized on the basis of generalized nonlinear canonical expansion. Method of extrapolation doesn't impose any essential limitations on the series of random processes with discrete argument which are under investigation (linear, Markovian behavior, stationary, monotony etc.). Special attention paid to the changes of the condition of electronic devices and information systems for achieving maximum accuracy of the prediction problem solution.

163. Babych M., Kovalenko A. Food security indicators in

ukraine: current state and trends of development. *Baltic journal of economic studies*. 2018. Vol. 4, Issue 1. C. 8-15. DOI: 10.30525/2256-0742/2018-4-1-8-15.

The purpose of the paper is to study the current state of food security of Ukraine in order to identify the problem areas forming the system of food security in the country. Methodology. Assessment of the current state of the food security in Ukraine is carried out according to the Test Method for determining key indicators of food security, approved by the Cabinet of Ministers of Ukraine on 05.12.2007. 1379 "Some Issues of Food Security" (as amended on 21.10.2011). Results. The article deals with the current state of food security in Ukraine for the next indicators: the daily energy value of the human diet, sufficiency consumption of certain products, the adequacy of supplies of grain in state resources, economic availability of food, differentiation value of food by social groups, market capacity of individual products, food self-sufficiency for a certain product. The study found that the state of Food Security in 2015 in Ukraine satisfied the set threshold values and rules by the majority of indicators. Practical implications. The value of particular indicators, calculated according to 2015 and compared to 1995, positively characterized the dynamics of food security in Ukraine. However, there is a necessity for a balanced state policy of the internal market and the agrarian sector's regulating. Value/originality. It is an obvious fact that it is needed to respect the objectives set out in the Strategy for Sustainable Development "Ukraine-2030" in the directions of development, security, responsibility, and pride.

164. Balashov I., Kramarenko S., Shyriaieva D., Vasyliuk O. Invasion of a crimean land snail brephulopsis cylindrica into protected relict steppic hilltops (tovtrs) in western Ukraine: a threat to native biodiversity? *Journal of conchology*. 2018. Vol. 43. C. 59-69. Ч. 1. URL: https://apps.webofknowledge.com/full_record.do?prod

uct=WOS&search_mode=GeneralSearch&qid=13&SID=D4ZpHW5pwWcvxBfSUun&page=1&doc=7&cacheurlFromRightClick=no.

Brephulopsis cylindrica (Menke 1828), a snail native to the Crimea, has been expanding northward and westward, and has recently reached Western Ukraine. Three adjacent and abundant colonies have been found in the tovtrs (small rocky hilltop areas of protected relic steppic habitat) of the Podilski Tovtry National Nature Park in Western Ukraine. These sites and ten similar sites without B. cylindrica were sampled. Most of the snail species that occur in the other ten sites were absent from the samples from the sites with B. cylindrica, which have much lower molluscan diversity. It is suggested that B. cylindrica is excluding some threatened native snails that have comparable ecological preferences, notably Helicopsis striata. Possible mechanisms of competition with native species are discussed. The most likely explanation is that these native snails are displaced from seasonal refuges in rock crevices as a result of the high densities of B. cylindrica. The snails in Western Ukrainian populations of B. cylindrica are smaller than in populations from the Crimean mountains, but similar in size to populations from the Crimean plains, which may be where they originated.

165. Characteristics of the Genetic Structure of Snow Sheep (Ovis nivicola lydekkeri) of the Verkhoyansk Mountain Chain / Deniskova T. E. etc. *Russian journal of genetics*. 2018. Vol. 54, Issue 3. C. 328-334. DOI: 10.1134/S1022795418030031.

Genetic characteristics of the allele pool of four groups of the Yakut snow sheep subspecies (Ovis nivicola lydekkeri) inhabiting various parts of the Verkhoyansk Mountain Range such as Kharaulakh Ridge, Orulgan Ridge, ridges of the Central Verkhoyansk, and Suntar-Khayata Ridge is presented. Fragment analysis using 17 microsatellite loci was carried out using the ABI 3131xl genetic analyzer. Significant heterozy-

gote deficiency was detected in all investigated snow sheep populations. Differentiation of the studied groups in accordance to their geographical origin was revealed.

166. Dubinina M., Ksonzhyk I., Syrtseva S. Forensic accounting: the essence and prospects of development in Ukraine. *Baltic journal of economic studies.* 2018. Vol. 4, Issue 1. C. 131-138. DOI: 10.30525/2256-0742/2018-4-1-131-138.

The subject of the study is a set of theoretical, organizational, and methodological principles for the development of forensic accounting in Ukraine. General scientific and special methods of cognition are the methodological basis of the study. The content of the concept "forensic accounting" is specified using theoretical generalization methods; the comparison of audit and forensic accounting using comparison method is carried out. Using the abstract-logical method and structural-logical analysis, features, current problems, and obstacles to the development of forensic accounting in Ukraine are determined. The objective of the study is to consider the essence of the concept of "forensic accounting", to introduce the main obstacles, and to propose a list of measures for its development in Ukraine. As a result of the study, it is established that forensic accounting is a combination of legal and financial audit and forensic accounting expertise. Therefore, experts of all these profiles should be involved to the forensic accounting, which will help the company solve the conflict situations related to fraud. It is substantiated that when improving the method of forensic accounting, it is necessary to understand its difference from the audit. The study found that the most common types of fraud faced by Ukrainian companies are asset theft, unreasonable and inappropriate spending. The most common ways to detect fraud in Ukraine are internal audit and informal internal sources. Only 10% of Ukrainian companies have experience in attracting external consultants to independent investigations. However, as practice shows, the

very independent, unbiased view of the external specialist on the control system and business processes allows creating a high-quality system of preventive mechanisms for counteracting fraudulent actions and in general, improving the efficiency of business processes of the company. It is substantiated that forensic accounting is one of the effective instruments of an independent economic investigation. It is established that forensic accounting is quite new for Ukraine and audit and specialized companies are only at the beginning of the path in this direction. In order to develop this type of services, audit and specialized companies were suggested to expand the range of services in the direction of forensic accounting and the appropriate procedure for carrying out such activities. In addition, it is necessary to take into account the foreign experience of the training of specialists in the field of forensic accounting, that is, to start the training of specialists by including specialized courses on forensic accounting in the curricula of higher educational institutions. It is also necessary to develop the cooperation of Ukrainian professional organizations with foreign professional organizations in order to provide specialists with the possibility to obtain international certificates, as well as to involve audit, legal, and consulting companies in the process of professional training in forensic accounting. Study conclusion. Thus, forensic accounting includes a set of measures for the settlement of financial, economic, legal, commercial, and other issues that involve significant economic risks. The use of forensic accounting by domestic companies will increase the effectiveness of managing their business risks by adopting optimal management decisions and ensuring the profitability of the business.

167. Effect of agrotechnological elements on milk thistle (Silynum marianum) productivity / R. A. Vozhehova etc. *Regulatory mechanisms in biosystems*. 2018. Vol. 9, Issue 2. C. 156-160. DOI: 10.15421/021823.

The milk thistle is a highly valuable medicinal plant, widely used in treatment of liver diseases. Soil-climate conditions of the steppe zone of Ukraine are favourable for crop cultivation. The goal of the study was to determine relations between milk thistle productivity and elements of cultivation technology, viz., primary tillage depth (14-16 and 20-22 cm), inter-row spacing (30, 45, 60 cm), timing of sowing (3rd decade of March, middle of April, 3rd decade of April) and mineral fertilizer application doses (no fertilizers, N45P45, N90P90). Field trials were carried out during the period from 2010 to 2012 on the irrigated lands of the Institute of Rice of the National Academy of Agrarian Sciences of Ukraine by using the split plot design method in four replications. The climate of the territory of the trials is typical for the steppe zone. The soil type was dark-chestnut residual solonetz middle-loamy soil. We used the Yuhoslava variety of milk thistle in the trials. Cultivation technology was standard, excluding the studied factors. The results of the trials showed significant impact of all the studied cultivation technology elements on milk thistle seed and oil yields. The maximum average seed (1.66 t/ha) and oil (489 kg/ha) yields were obtained under the primary tillage at the depth of 20-22 cm, inter-row spacing of 60 cm, sowing in the 3rd decade of March, applying mineral fertilizers in a dose of N90P90. The highest input in seed and oil yields rise was made by the mineral fertilizers, which increased milk thistle productivity by 1.57 times comparatively with non-fertilized treatments. We also established a strong direct interrelationship between seed and oil yield: coefficient of determination was 0.96. Results of the current study are slightly limited, so further investigations in the field of milk thistle cultivation technology development and improvement are required to provide Ukrainian farmers with scientifically grounded agrotechnology of this valuable medicinal plant.

168. Fitting competing models and evaluation of model parameters of the abundance distribution of the land snail

Vallonia pulchella (Pulmonata, Valloniidae) / O. N. Kunakh etc. *Regulatory mechanisms in biosystems*. 2018. Vol. 9, Issue 2. C. 198-202. DOI: 10.15421/021829.

This paper summarizes the mechanisms behind the patterning of the intra-population abundance distribution of the land snail Vallonia pulchella (Muller, 1774). The molluscs were collected in recultivated soil formed on red-brown clays (Pokrov, Ukraine). Data obtained in this study reveal that V. pulchella population abundance ranges from 1 to 13 individuals per 100 g of soil sample. To obtain estimates of the mean, three models were used: the model of the arithmetic mean, the Poisson model and a log-normal model. The arithmetic mean of the occurrence of this species during the study period was 1.84 individuals/sample. Estimation of the average number of molluscs in one sample calculated using the Poisson model is lower and equals 1.40 individuals/sample. The distribution of the number of individuals in a population was described by the graphics "rank - abundance". The individual sample plot sites with molluscs may be regarded as equivalents of individual species in the community. For the analysis, the following models were used: broken sticks model, niche preemption model, log-normal model, Zipf model, and Zipf-Mandelbrot model. Applying the log-normal distribution gives a lower estimate of the mean density at 1.28 individuals/sample. Median value and mode is estimated at 1.00 individuals/sample. The Zipf-Mandelbrot model was shown as the most adequate to describe distribution of the V. pulchella population within the study area. The Zipf-Mandelbrot model belongs to the family of so-called non-Gaussian distributions. This means that the sample statistics do not possess asymptotic properties and by increasing the sample size, they tend to infinity, and are not close to the values of the general population. Therefore, the average value of the random variable that describes the non-Gaussian distribution has no statistical meaning From an environmental point of view, this means that within the study area the capac-

ity of the habitat is large, and for some combination of environmental conditions the rapid growth of the abundance of a given species is possible.

169. Genetic diversity and bottleneck analysis of the Red Steppe cattle based on microsatellite markers / A. S. Kramarenko etc. *Ukrainian journal of ecology*. 2018. Vol. 8, Issue 2. C. 12-17. DOI: 10.15421/2018_303.

Thirty-nine dairy cows representing the Red Steppe (RS) cattle breed (the State Enterprise "Pedigree Reproducers "Stepove" Mykolayiv region, Ukraine) were included in the study. A set of 11 microsatellite markers recommended by International Society of Animal Genetics (ISAG) for cattle was used to study genetic diversity in the RS cattle population. All of the studied loci were highly informative and polymorphic. In total, 71 alleles were detected at 11 microsatellite loci, from which 16 (22.5%) had frequency lower than 5%. The number of detected alleles per locus (TNA) ranged from four to ten, with a mean value of 6.45 +/- 0.51. The mean effective number of alleles (Ae) was 3.77 +/- 0.37. The allele frequencies ranged from 0.013 to 0.714. The average values for observed (Ho) and expected (He) heterozygosities were 0.607 +/- 0.085 and 0.703 +/- 0.034, respectively. The within breed estimate FIS indicates heterozygosity shortage of 0.179. The Hardy-Weinberg equilibrium test revealed that 2 out of 11 loci deviated from equilibrium. The RS cattle population is non-bottlenecked, i.e., it has not undergone any recent reduction in the effective population size and remained at mutation-drift equilibrium. The estimated mean Ne for the RS cattle population was 23.3 (95% CIs = 11-74) individuals. These low values emphasize the need of controlling the rate of increase of inbreeding in the RS cattle herds.

170. Genetic diversity of Ukrainian local pig breeds based on microsatellite markers / Kramarenko S. S. etc. *Regulatory mechanisms in biosystems*. 2018. Vol. 9, Issue 2. C. 177-182. DOI: 10.15421/021826.

Preserving the current diversity of the living material on Earth is fundamental for the survival of future generations. A study was conducted to investigate the genetic diversity of Ukrainian local pig breeds. A total of 350 pigs representing five local pig breeds from Ukraine (Mirgorod - MIR, Poltava Meat - PM, Ukrainian Meat - UM, Ukrainian White Steppe - UWS and Ukrainian Spotted Steppe - USS) and one commercial breed (Duroc, DUR) were sampled. Twelve microsatellite loci (SW24, S0155, SW72, SW951, S0386, S0355, SW240, SW857, S0101, SW936, SW911 and S0228) were selected and belong to the list of microsatellite markers recommended by ISAG. The results indicate that there exists, in general, a high degree of genetic variability within the five Ukrainian local pig breeds. However, the genetic variability in the MIR and PM breeds was significantly lower (mean Na = 2.92-3.92; Ho = 0.382-0.411; F-IS = 0.178-0.184) than in the other three Ukrainian local pig breeds - UM, UWS and USS (mean Na = 5.00-8.42; Ho = 0.549-0.668; F-IS = 0.027-0.066). Thirty-four private alleles were identified among the six analyzed genetic groups which were distributed between 11 of the 12 loci. A high number of alleles typical for the breed (private alleles) was observed in Duroc pigs - 9 alleles did not occur in Ukrainian local pig breeds. The HWE test showed that all of the polymorphic loci deviated from HWE ($P < 0.05$) in at least one population. Loci S0355 (5), S0386 (4) and SW24 (4) presented a higher number of populations in imbalance. The mean F-ST showed that approximately 77.8% of the genetic variation was within-population and 12.2% was across the populations. The five Ukrainian local breeds were classified into two major groups, according to the phylogenetic tree, which was based on standard genetic distance. Overall, we found that 92.6% of the individual pigs were correctly assigned (324 out of 350) to the respective breed of origin, which is likely a consequence of the well-defined breed structure. Probabilities from the allocation test of individuals for the six pig genetic groups were estimated with Structure Har-

vester. In cluster 1 the highest grouping probabilities were found for the MIR (0.917) and PM (0.750) breeds. Local breeds UM (0.824) and USS (0.772) were grouped in cluster 2. Cluster 3 was related to the local pig breed USW (0.873). Cluster 4 presented high allocation probabilities for the commercial pig breed Duroc (0.924). The obtained results are important for the future conservation of Ukrainian local pig breeds.

171. Genetic Polymorphism of Microsatellite Loci and Their Association with Reproductive Traits in Ukrainian Meat Breed Pigs / Lugovoy S. I. etc. *Cytology and genetics*. 2018. Vol. 52, Issue 5. C. 360-367. DOI: 10.3103/S0095452718050079.

The primary goal of the study was to estimate the genetic diversity and population structure of the Ukrainian Meat breed pigs. Twelve microsatellite markers were selected from the list of the microsatellites recommended by FAO/ISAG. The range of alleles per locus (Na) was found to be from 5 to 14 with an average of 8.42, and a total of 101 alleles were observed at these loci. The observed heterozygosity (Ho) was averaged 0.668 and expected heterozygosity (He) was 0.718, respectively. The LD-based population effective size (Ne) estimate for the Ukrainian Meat breed pigs was 68.3 (95% CI: 52-92) individuals. This population has not undergone any recent and/or sudden reduction in the effective population size and remained at mutation-drift equilibrium. The SW24, SW951, SW240, S0101, SW936, and S0228 loci genotypes were found to affect the total number of piglets born (TNB), the number of piglets born alive (NBA), and the number of piglets weaned (NW).

172. Herasymchuk H. A., Baranovsky V. M., Herasymchuk O. O., Pastushenko A. S. Analytical research results of the combined root digger. *Inmateh-agricultural engineering*. 2018. Vol. 54, Вип.1. С. 63-72. URL: https://apps.webofknowledge.com/full_record.do?prod

uct=WOS&search_mode=GeneralSearch&qid=3&SID=F5UUjRSYjDRtluuzYSb&page=3&doc=24&cacheurlFromRightClick=no.

This paper researches the operation principle structure of a combined root digger that consists of two spherical disks and, above them, a horizontal shaft with cleaning blades. Mechanical and technological justification of structural and kinematic parameters and operating modes of combined digger was carried out based on the analysis of technological process of roots excavation. The dependence of digger operation on the condition of providing complete digging of the root crops is obtained. Deterministic mathematical models of the interaction between the cleaning blade and the root head provided no not dumping and non-damaging of root, were developed.

173. Honcharenko I., Kozachenko L., Moroz T. Informational support of the rural areas' development. *Baltic journal of economic studies*. 2018. Vol. 4, Issue 4. C. 93-99. DOI: 10.30525/2256-0742/2018-4-4-93-99.

The purpose of the article is to determine peculiarities of using modern communications and telecommunications, virtual space, assessing the availability of relevant information that reflects all aspects, processes which are taking place in the economic, social life, and ecology of rural areas. Another purpose is the development of directions for solving existing problems. Methodology. Methods for theoretical synthesis, analysis, and comparison were used in the process of determination of features and substantiation of the basic concepts. Results of the research. It was revealed that in the information provision of Ukrainian rural areas functioning has accumulated a considerable potential. There are such crucial strengths as an existence of a developed infrastructure of state statistics, hierarchically structured organizational structures (centre, region, district) that can provide information collection and processing, as well as its distribution in

the opposite direction. Also, there are highly skilled IT specialists and organizational opportunities for their training and retraining. Among other points are the following: an existence of the databases, where scientific and technical information were accumulated; an existence of the databases of modern agricultural technologies; and there is also a developed research infrastructure. But today, the level of use of automation tools continues to remain extremely low in the rural management authorities in Ukraine. The long-standing experience in using information technologies by enterprises and organizations is practically not used in the management of territories. Full informational support of rural areas is possible in case of the organization of the qualitative monitoring of their development with simultaneous taking into account further forecasts for a set of most characteristic indicators for the territory in a certain period of time. A promising task is the integration of Ukraine's information systems into the international information space. This task involves synchronizing national standards, methodologies, and tools with international standards, as well as improving communication with international scientific and information centres. Practical implications. The creation of an integrated information and communication system of rural areas will help to solve the tasks of effective territorial management. The main components of this system will be the following: the developed infrastructure for access to information; informational systems of local self-government bodies; informational monitoring systems; e-commerce and marketing systems; consulting electronic services; distance learning and retraining systems. Within the enterprises, it is necessary to use information and computer technologies for the accumulation of data about the social, economic, and ecological activity. It is advisable to supplement the monitoring information regarding the development of rural areas by subjective assessments, results of sociological surveys. An improvement of the software system "Household Accounting for Village Councils" involves the use of client-

server technology with the combined use of telecommunication and print media. A promising area for research and management of rural areas on the basis of the spatial representation of processes is the use of geographic information systems and global positioning. Value/originality. The integrated informational and communicational system of rural territories will ensure the efficiency and quality of their information support and will become the basis of effective management.

174. Kalinichenko A., Havrysh V., Hruban V. Heat Recovery Systems for Agricultural Vehicles: Utilization Ways and Their Efficiency. *Agriculture-basel*. 2018. Vol. 8., Issue 12:199. DOI: 10.3390/agriculture8120199.

The focus of today's agriculture is to reduce fuel consumption and pollutant emission. More than 50% of the fuel energy is lost with the exhaust gas and coolant of diesel engines. Therefore, waste heat recovery systems are a promising concept to meet economical and ecological requirements. Agricultural vehicles have an operating cycle that is quite different from on-road trucks (higher engine load factor and less annual utilization). This has influence on the efficiency of waste heat recovery. The purpose of this paper was to analyze different waste heat recovery technologies to be used in agricultural applications. In the study, technical and economic indicators have been used. According to suggested classification, four pathways for utilization were studied. Turbocompounding, electric turbocompounding, and heating of transmission oil for hydraulic clutch gearboxes have proved to be effective for agricultural vehicles. For the economical conditions of the European Union (EU), a turbocompounding diesel engine is acceptable if agricultural tractor rated power is more than 275 kW, and combine harvester rated power is more than 310 kW. In cold climates, heat recovery transmission warm-up may be recommended. Waste heat absorption refrigerators have proven to be a viable technology for air

conditioning and intake air cooling systems.

175. Klochan V., Klochan I. Improvement of the mechanism of state regulation of investment in the innovative development of the agrarian sector. *Baltic journal of economic studies*. 2018. Vol. 4, Issue 2. C. 99-105. DOI: 10.30525/2256-0742/2018-4-2-99-105.

The purpose of this article is to analyse the main factors of innovative development of the agrarian sector, to run a research on investment support of innovations, which will enable to determine the main directions of improvement of the mechanism of state regulation of investment in the innovative development of the agrarian sector of the country. The methodology of the research is to substantiate the necessity of state support of innovative development of the agrarian sector, as a priority direction of its investment support, which involves the implementation of a set of measures to change existing trends, reducing the amount of financing of scientific and technical works, and reducing the number of research institutions involved in the development and implementation of innovative products in agriculture, while creating an institutional environment for development and implementation of agrarian innovations through the national and regional investment funds, promotion of the implementation of scientific developments into production by expanding the availability of financial resources through public and private partnerships and the commercialization of research results. The results of the study indicate that Ukraine's agriculture has potential opportunities to improve its competitive advantage in world markets. However, in order to strengthen them, it is necessary to take a number of measures: to form economic and political support for agricultural enterprises using scientific equipment and new technologies; to ensure the creation and distribution of a network of innovative funds to support innovative business at different levels; to orient all loans and support in Ukraine to implement innovative projects in specific areas of produc-

tion development, including innovation and investment support of agricultural enterprises; Provide additional tax incentives for enterprises producing innovative products, which will increase the financial resources for the implementation of innovation projects and innovation program; clearly identify the legislative provision of funding and form a mechanism to support small businesses. Practical meaning. The identified development priorities can serve as a basis for creating conditions for the domestic agricultural enterprises to implement the offensive strategy in foreign markets, supporting constructive competition in the domestic market, which will stimulate agrarian formation to innovation, ensure close integration of production and science, in order to facilitate the advance development of scientific and technological sphere. Value/Originality. The results of the study indicate that improving the investment provision of the agrarian sector of the economy involves determining the prospects for its long-term development based on scientifically based methodological approaches, the use of which allows measuring changes and expected socioeconomic outcomes.

176. Korol I., Poltorak A. Financial risk management as a strategic direction for improving the level of economic security of the state. *Baltic journal of economic studies*. 2018. T. 4, Issue 1. C. 235-241. DOI: 10.30525/2256-0742/2018-4-1-235-241.

The purpose of the paper is to generalize theoretical and methodological principles and develop practical recommendations aimed at improving financial risk management as a strategic direction for improving the level of economic security in Ukraine. Methodology. The methodology for this study was based on methods of scientific abstraction, methods of the system-functional approach, grouping, generalization and formalization, systematization, analysis and synthesis, statistical and economic methods, peer review. Results. It is proved that the economic essence of financial risk management as a

strategic direction for improving the level of economic security consists in the permanent and continuous application of procedures for communication and definition of management context (management goals, distribution sector, list of criteria to be taken into account in the management process), management policy, as well as selection, comprehensive analysis, quantification and processing of financial risks (allocation of alternative ways to reduce the impact), which are characterized by specific characteristics of financial sector risks. The present situation of the financial environment of the financial sphere is analysed by calculating indicators and generalizing them in the integral index which dynamics in 2011-2017 tends to deteriorate values. This means lowering the level of financial security. The method of quantitative assessment of financial risks through reasonable algorithm is improved. It consists of the following stages: analysis of indicators of the state of financial security structured according to its subsystems; assessment of the level of financial risks in the system of economic security; comprehensive risk assessment in financial security subsystems; definition of the integral index of financial risks in the system of economic security. Directions of financial risk management in the system of economic security are generalized and their groupings are organized according to distinct subsystems of economic security in Ukraine. The mechanism of financial risk optimization is substantiated. It provides a description of the process of achieving the optimal characteristics of identified financial risks in subsystems of economic security. Its purpose is to minimize social and economic consequences of the destructive impact of the risk environment and improve the overall state of economic security of the country and society. Practical implications. The practical significance of the obtained results is the proven and justified feasibility of using proposed recommendations in the field of financial risk management to improve the level of economic security in Ukraine and a mechanism for optimizing financial risks, which describes the process of

achieving the optimal characteristics of identified financial risks in the subsystems of economic security. Value/ originality. The information base of the article is the legislative and regulatory documents, consolidated data of the State Fiscal Service of Ukraine, the State Statistics Service of Ukraine, Ministry of Finances of Ukraine, the National Bank of Ukraine, Ministry of Economic Development and Trade of Ukraine, periodicals and reference publications, Internet resources, and results of authors' studies and calculations.

177. Mudrak R., Lagodiienko V., Lagodiienko N. Impact of aggregate expenditures on the volume of national production. Economic annals-XXI. 2018. Vol. 172, Issue 7-8. C. 44-50. DOI: 10.21003/ea.V172-08.

Ukrainian economy, which is recovering after the severe crisis in 2009, has shown obvious signs of macroeconomic instability over the last five years, namely the slowdown of economic growth in 2012-2013 and the recession during the 2014-2015 period. One of the main reasons for this is the irrational structure of national consumption. The present study allows finding out that the biggest defects of the structure of the aggregate expenditures of the Ukrainian economy are the reduction in the share of gross capital formation and an increase in the share of net export with minus. The main factors hampering private capital formation in Ukraine are the reduction of national savings and excessive market concentration. Rapid inflation rates and an extremely low level of confidence in financial intermediaries from the part of Ukrainian households to buy foreign currencies, which they save as non-performing assets (cash). This is an extraction of resources from the "profits-expenditures" flow, which do not work for the economy and are extremely scarce. The chronic negative net export of Ukraine is connected with unsatisfactory terms of trade, because high-tech science-intensive products and excessive amounts of hydrocarbons are imported, and the products with a low level of processing are mainly

exported. This is explained by the insufficient tempo of technological modernisation of the Ukrainian economy and innovation lag: 40% of workers employed in the industry are engaged in the production at the low technological level, about 20% - at the average level and only 2.5% - at the high level. The increase of GDP due to the introduction of new technologies in Ukraine is estimated at 0.7-1%, while in developed countries it reaches 60% and more. Comparison of Ukraine with other European countries in terms of aggregate expenditures structure in 2012-2017 substantiated the need for deep structural change in the country.

178. Novikov O., Dubinina M., Kuzoma V. Due diligence: essence and possible prospects of development. *Baltic journal of economic studies*. 2018. Vol. 4, Issue 2. C. 141-146. DOI: 10.30525/2256-0742/2018-4-2-141-146.

The subject of the study is a set of theoretical, methodological principles for the implementation of the due diligence procedure as an audit service in Ukraine. The methodological basis of the study is general scientific and special methods of cognition. There was clarified the concept of due diligence as audit service using the methods of theoretical generalization, comparison of the accounting, and due diligence by the method of comparison. The peculiarities, current problems, and obstacles of the development of due diligence in Ukraine are determined with the help of the abstract-logical method and structural-logical analysis. The objective of the study is to consider the essence of the concept of due diligence as an audit service, to identify the main obstacles, and to formulate prospects for its development in Ukraine. In Ukraine, the due diligence is equated to a legal audit. However, the concept of the legal audit is much narrower and characterizes the legal expertise of the company's compliance with the requirements of the law. As a result of the study, it was found that due diligence is a procedure for conducting a comprehensive examination of an investment

agreement in the framework of making a decision on effective capital investment by minimizing risks in order to preserve this capital and its potential future increase. It is proved that it is expedient to involve specialists of different professional orientations such as appraisers, lawyers, financiers, project managers, and crisis managers for the implementation of due diligence. The task team can include economists, engineers, security specialists and other experts. Varieties of due diligence are considered and its differences from the traditional audit are determined. It is substantiated that when improving the method of due diligence, it is necessary to understand its difference with the audit. The role of the due diligence procedure in the conclusion of enterprise sales contract is determined, namely, the reduction of existing investment risks. The "success" of the agreements or their "failure" is explained by the nature of the emerging synergy, and also by the fact that enough time was spent on conducting the due diligence. The sequence and structure of the due diligence process, as an audit service, were defined, outlining the content of its individual stages and works, which gave an opportunity to develop the algorithm of the due diligence procedure. It is established that due diligence is a rather new phenomenon for Ukraine, and audit and specialized companies are only at the beginning of the path in this direction. In order to develop this type of services, it was suggested that auditors and specialized companies expand the range of services in the direction of due diligence and the corresponding procedure for its conduct. The cooperation of Ukrainian professional organizations with foreign professional organizations should be developed in order to provide specialists with the possibility to obtain international certificates, as well as to involve audit, legal, and consulting companies in the process of vocational training in the direction of due diligence. The conclusion of the study. Thus, due diligence includes a set of measures to conduct a comprehensive examination of an investment agreement within the framework of making a decision

on effective capital investment, which involves significant economic risks. The need for due diligence is due primarily to the fact that in today's market relations, the requirements of investors, banking institutions, and buyers are increased to the transparency of information about the object of investment, lending or purchase. Due diligence as a research tool allows you to get a realistic assessment of your business, to determine the financial position and business development trends, as a result of obtaining information that will have a qualitative impact on effective management decisions.

179. Oliynik V. V., Samoylenko O. M., Batsurovs'ka I. V., Dotsenko N. A. Formation of future agricultural engineers professional competences in computer-oriented environment of higher education institutions. *Information technologies and learning tools*. 2018. Vol. 68, Issue 6. C. 140-154. DOI: 10.33407/itlt.v68i6.2525.

The article considers the technology of competences acquirement for the higher education applicants of specialty 'Agricultural engineering' in the conditions of information and educational environment. There are analyzed the concepts of competency and competences. Thre are considered the general and professional competences of the future agricultural engineers in accordance with the current standards. It is proposed the methods for coding competences and their structural components. There are provided the tools of the information and educational environment, with the help of which it is possible to realize the acquisitions of the competences of future agricultural engineers. To ensure that the system for the competences acquirement for the future agricultural engineers is rational in the conditions of the information and educational environment, there are presented the stages of the technology: the formation of curriculum, the coding of competences, the development of the competence repository. In the context of the information and educational environment, there are presented the tools for ob-

taining the future agricultural engineers competences, such as interactive lectures on audio-visual support, online lab work with multimedia support, electronic test training simulators; interactive test online control, animated multimedia presentations for practical work; electronic online questionnaire of knowledge control, videoconference for the development of engineering thought, online glossary for applicants of higher education with the aim of mastering engineering terminology from professional disciplines, communicating in a thematic forum to discuss problematic questions and answers to questions from higher education applicants. The authors have presented the scheme for assessing the existing professional competence of future agricultural engineers, which is based on a system of empirical indicators reflecting the level of mastery of competence. It is also presented the calculation of the regression coefficient in the process of obtaining competences in the conditions of the information and educational environment. It is emphasized that the mentioned system is influenced by statistical studies (measurement and analysis - systematization and grouping of statistical data); qualitative and quantitative assessment of the degree of expression of the characteristics of the subjects - assessment of the components of competence and input, current, modular and final control, expert evaluation, solution of design tasks, testing and recording of the regression coefficient in the process of acquiring the competences of future agricultural engineers in the conditions of the information and educational environment. It is given the formula for calculating the regression coefficient, which can take into account the factors that affect the process of entering competences for future agricultural engineers in the context of the information and educational environment.

180. Oliynyk V.V., Samoilenko O. M., Ruchynska N. S. Method of automated assessment of results of laboratory work execution on applied mathematics by applicants of higher education. *Information technologies and learning*

tools. 2018. Vol. 66, Issue 4. C. 162-172. DOI: 10.33407/itlt.v66i4.2303.

In the context of reforming education in Ukraine, electronic systems for managing the learning process and web resources of educational disciplines as components of these systems are widely introduced into the educational process. The need to improve the quality of education and the effectiveness of monitoring the knowledge of applicants for higher education have led to an increase of interest in automated knowledge assessment. Laboratory classes play a leading role in developing skills and application of the acquired knowledge. The effectiveness of using computer technology in laboratory classes depends on the qualitative methodology for conducting them through the academic discipline web resource tools and the automated evaluation of learners' knowledge and acquired skills. The paper justifies the relevance of automated assessment of students' knowledge and skills for higher education, describes the methodology for conducting laboratory classes using the web resource tools of the academic discipline and the technology of automated knowledge and skills assessment based on the results of students' laboratory assignments. The key idea of the proposed methodology is phased approach to the laboratory work implementation inside and outside the classroom through the academic discipline web resource tools, which includes the preparation manual and automatic access to the laboratory work, implementation and defence of laboratory work with the automated assessment of the corresponding reports. The technology of automated laboratory work assessment is understood as a technology of quality assessment in higher education. To determine whether the answer is correct the relevant algorithms have been incorporated into the web resources of the training course.

181. Optimization of Ginkgo biloba cultivation technology in open soil conditions / Kovalenko I. M. etc. *Regulatory Mechanisms In Biosystems*. 2018. Vol. 9, Issue 4. C.

535-539. DOI: 10.15421/021880.

In recent years, interest in cultivating Ginkgo biloba L. as a medicinal plant has grown in Ukraine, and improvement of the technology of growing this plant in the conditions of the North-East of Ukraine is a relevant problem. The purpose of this article to present research on the morphological structure, growth and viability of young G. biloba plants in grown from seeds by different technologies and comparative analysis of growth and development of G. biloba plants under greenhouse conditions and on open soil. The experiment on G. biloba cultivation was initiated in 2014 in three variants (the plants were grown from the seeds). Variant No 1: G. biloba growing in a greenhouse at 60-80% humidity and temperatures not below +27 degrees C; shading (shading level 60%) by green agronetting. Variant No 2: growing in open soil; shading (shading level 60%) by green agronetting; the climatic conditions were typical for Sumy region. Variant No 3: growing in open soil; there was no shading; climatic conditions were typical for the Sumy region. Plant analysis was conducted in June 2018. The following morphometric parameters of G. biloba plants were measured: plant height, annual growth of shoots, number of leaves, leaf size and leaf area, phytomass of the shoots, phytomass of leaves and phytomass of the stem, diameter of the shoots. The sampling used 60 samples. The leaf area was determined by the method of drawing contours on millimeter paper. Statistical processing of research results was carried out by generally accepted modem methods of mathematical statistics using dispersion, correlation, regression and vital analysis. In the conditions of the Ukrainian North East, G. biloba seedlings can be grown successfully in greenhouses and open soil, both with 60% shade by agronetting and without it. Differences between the plants grown in such conditions are insignificant and statistically unreliable. The obtained three to four year old G. biloba seedlings grown using different technologies were 25-

30 cm in height and formed 13-17 leaves per plant The seedlings were of quite high viability (Q is 022-0.30) and morphostructural integrity (67.8%). The output of viable seedlings (vital classes "a" and "b") in variant 1 was 60%, variant 2 - 45% and variant 3 - 60%. Ecologicalcenotic stability of G. biloba was observed repeatedly, though certain limitations on G. biloba cultivation may be that the plant is photophilic and thermophilic. But the conducted experiments show that the climatic conditions of the Ukrainian North-East are quite favourable for this species. Based on the data obtained for the Ukrainian North-East, it is possible to recommend the technology of growing G. biloba seedlings in open soil without agronetting as quite effective and low-cost.

182. Reconstructed historical distribution and phylogeography unravels non-steppic origin of Caucasotachea vindobonensis (Gastropoda: Helicidae) (vol 17, pg 679, 2017) / Kajtoch L . etc. *Organisms Diversity & Evolution*. 2018. Vol. 18, Issue 2. C. 261-262. DOI: 10.1007/s13127-018-0363-9.

One of the author's name of this article was incorrectly published as "Chris Wade". This is now presented correctly in this article as "Christopher M. Wade".

183. Safflower yields and quality depending on cultivation technology in the irrigated conditions / Vozhehova R. etc. *Agrolife scientific journal*. 2018. Vol. 7, Issue 2. C. 163-172. URL: https://apps.webofknowledge.com/full_record.do?product=WOS&search_mode=GeneralSearch&qid=13&SID=D4ZpHW5pwWcvxBfSUun&page=1&doc=2&cacheurlFromRightClick=no.

The article presents the results of scientific researches devoted to investigation of safflower yields and quality depending on cultivation technology in the irrigated conditions. Field trials were carried out during 2010-2012 at the

irrigated lands of the Institute of Rice of the National Academy of Agrarian Sciences of Ukraine in four replications by using the randomized split plot design method. We studied the effect on the crop yield and quality of such cultivation technology elements as: soil tillage, time of sowing, inter-row spacing and mineral fertilizers doses. We determined that all the studied factors had significant effect on the yields of safflower. The highest safflower seed yield averaged to 2.11 t ha (-1) under the plowing at the depth of 20-22 cm, sowing in the 3rd decade of March with inter-row spacing of 30 cm, application of mineral fertilizers in the dose of N90P90. The yield of safflower under the lower dose of mineral fertilizers N60P60 averaged to 2.02 t ha(-1), however, the difference between the treatment with N90P90 was proved to be insignificant. We also established that the studied cultivation technology elements caused significant effect on the safflower seed quality, except of husks content in the seeds. The maximum weight of 1000 seeds of 42.5 g, and the highest oil content of 29.31% were determined under the agrotechnological complex with plowing at the depth of 20-22 cm, sowing in the 3rd decade of March with inter-row spacing of 30 cm, application of mineral fertilizers in the dose of N90P90. The husks content in the seeds of the crop fluctuated within the values of 54.2-56.1%.

184. Samoylenko O. M., Batsurovs'ka I. V., Samoylenko O. O., Dotsenko N. A. Implementation of the model for masters preparation to educational and scientific activity in the conditions of massive open online courses. *Information technologies and learning tools*. 2018. Vol. 64, Issue 2. C. 197-220. DOI: 10.33407/itlt.v64i2.1894.

The article presents the results of experimental work. It is suggested to state and analyze the results of model implementation for masters preparation to educational and scientific activity in the conditions of massive open online courses. There are indicated specialties of the future masters that took

part in the experimental work, considered the list of adapted massive open online courses, in which the basis of the technologies of teaching is laid, offered the author's model. There are presented computational tables of the empirical value chi 2 of the motivational, cognitive content, reproductive and operative and productive and creative component at the beginning and at the end of the experiment in control and experimental groups, the graphic correlation on the coordinate axis of the critical and empirical values of the indicated components and the graphs of the results of the assessment of the readiness of masters educational and scientific activity in the conditions of massive open online courses at the beginning and at the end of the expedition rhythm in relative frequencies.

185. Shebanina O., Golubeva O., Burkovska A., Radzevicius G.THE investment in the meat sector in the context of food security in Ukraine. *Management theory and studies for rural business and infrastructure development*. 2018. Vol. 40, Issue 3. C. 393-402. DOI: 10.15544/mts.2018.37.

In the agricultural sector, it is important to identify the main directions of investment in order to ensure the food supply for the country's population. One of the most important cases in this sector is ensuring the secure supply of meat and meat products. The state has to choose the most effective tools for supporting the development of indigenous producers and the industry in this sector. The security of the country's food supply is influenced by a large amount of quantitative and qualitative factors. Interaction of these factors and the necessary state support instruments in the meat sector is unevenly treated in the researches of the scientists and varies depending on the specifics of the development of the food sector in a country. The problem of the research is to find out and evaluate the main financial demands and investment directions of the state's support programs for the support of Ukrainian meat's sector, which could help secure

the state's demand for the food supply. The purpose of the research is to find out effective mechanisms for the state support and financing of the long-term projects aimed to ensuring the food security in the country. The methodology of research: analysis of research results of Ukrainian and foreign scientists and statistical information (2006-2018 m.). The information is grouped and structured to determine the forecast of meat consumption in Ukraine for 2020, the expected number of population and the determination of the missing quantities of this product in the country. The study provides a model for identifying the volume of long-term investments to ensure the food the security of the country's supply of meat, identifying the main directions of these investments. The research was based on economic analysis and synthesis models, correlation-regression analysis, mathematic modeling method, etc. The results of research demonstrate the indicators of the food security in the country and determine the adequacy of the food consumption; also the estimation of the investment need for meat production by 2020 is carried out.

186. Shebanina O., Klyuchnik A., Burkovska A., Caruso D., Burkovska A. Providing labor income as a supporting factor of the food security. *Management theory and studies for rural business and infrastructure development*. 2018.T. 40, Issue 4. C. 599-608. DOI: 10.15544/mts.2018.52.

The lack of comprehensive provision of a sufficient level of economic affordability of food in conditions of social instability and low level of solvency of the population of Ukraine constitutes a threat to the food security of the state. The purpose of the article is to formulate the relationship between the economic affordability of food and the average monthly wage in the country, as well as arrears in its payment. The methodic of work is based on the usage of a correlation-regression analysis of the statistical information that reflects the structure of total household income in Ukraine, which made it possible to calculate the degree of influence of fac-

tors of the correlation model on the availability of food for the population. The results of the study indicate a significant stratification of the population in terms of purchasing power. The degree of dependence between the economic availability of food and the average monthly salary in the country, as well as the amount of arrears in its payment, which confirms the need for the government to create a sustainable system of social standards for the population, providing an adequate level of purchasing power, is established.

187. Shelyov A. V., Kopylov K. V., Kramarenko S. S., Kramarenko O. S. Genetic variation determination and interbreed differentiation of two Ukrainian dairy cattle breeds using microsatellite loci of dna. *Agricultural science and practice*. 2018. Vol. 5, Issue 1. C. 51-58. DOI: 10.15407/agrisp5.01.051.

The aim of our work was to investigate the interbreed differentiation of Ukrainian Red-and-Motley and Black-and-White dairy cows based on the results of the analysis of allelic and genotypic polymorphism of DNA microsatellites. Methods. Genotyping of 88 DNA samples of two most numerous dairy cattle breeds in Ukraine - Ukrainian Red-and-Motley and Black-and-White dairy cows - was conducted by 10 loci, recommended by the International Society for Animal Genetics (ISAG). The analysis of allelic and genotypic polymorphism was performed using parametric and nonparametric methods. Results. Informative value of DNA microsatellites as markers of genetic processes, which take place in the populations of domestic animals, was assessed. Conclusions. The investigated breeds demonstrate a reliable level of genetic differentiation with a high level of similarity.

188. Sirenko N. M., Baryshevskaya I. V., Poltorak A.S., Shyshpanova N. O. State and tendencies of intergovernmental regulation in Ukraine in conditions of fiscal decentralization. *Financial and credit activity-problems of theory and practice*. 2018. Vol. 2, Issue 25. C. 157-164. DOI:

10.18371/fcaptp.v2i25.136489.

A balanced socio-economic development of any country is closely related to the efficiency of the system of intergovernmental relations, which should be aimed at optimizing the process of fiscal decentralization and clear definition of the powers of local government. Interbudgetary regulation in Ukraine reflects processes of the national and political importance and is of great importance in the composition of intergovernmental fiscal relations, which priority is growing in terms of decentralization reforms. Purpose. The main objectives of this study are: to summarize a complex task that is resolved in the process of budgetary control; to analyze the dynamics of revenues of the consolidated budget of Ukraine in 2007-2016 and the proportion of own local revenues in GDP; to distinguish formation features of Ukrainian local budgets by region; to analyze volumes of local budgets per capita in terms of area; to highlight the leverage rate of local budgets; to analyze the share of interbudget transfers in total local budgets. Results. The study is a synthesis of the complex challenges that must be resolved in the process of budgetary control, such as: balancing the budget; foster the interest of local governments in the maximum revenue mobilization; reallocation of existing budgetary resources, taking into account local features. The dynamics of the revenues of the consolidated budget of Ukraine in 2007-2016 was analyzed and concluded that the proportion of own local revenues in GDP tended to decrease with a simultaneous increase in the share of the interbudget transfers from the state budget. Abovementioned resulted in the ensuring of a stable share of local budgets in the GDP structure (at 14-15%). As a result of the intergovernmental fiscal decentralization reform by the results of 2016 the share of own revenues of local budgets Ukraine in GDP rose to 7.2%, or 1.1% compared to 2015 with a simultaneous decrease in the interbudget transfers share from the state budget to 8.2% (0.6% compared to 2015). Analyzed the share interbudget transfers in total local

budgets, which for a long period tended to increase (from 47.2% in 2007 to 53.4% in 2016), which is contrary to the basic principles of fiscal decentralization. Conclusion. Grounded features of Ukrainian local budget revenues by region and proved that the unevenness of income between regions of Ukraine are often equivalent to the level of industrial production. Analyzed volumes of local budgets per capita in terms of area. Presented the list of influence instruments on local budgets indexes of incomes, including the increase in the minimum wage, inflation, continuing reform of the budget system in the direction of fiscal decentralization and transfer volumes.

189. Sirenko N., Melnyk O., Shyshpanova N. Prospects for implementing participatory budgeting as an effective instrument for implementing budgetary policy at the local level. *Baltic journal of economic studies*. 2018. Vol. 4, Issue 2. C. 222-228. DOI: 10.30525/2256-0742/2018-4-2-222-228.

The purpose of the study is to determine the methodological principles for implementing Participatory Budgeting as an effective instrument of the budgetary policy at the local level, in particular, the analysis of the main risks and limitations of this process, the identification of its main stages and the features of the main types of activity, which includes each stage. Methodological bases of the study consist of general scientific methods of obtaining knowledge of economic phenomena and processes. Realization of study tasks requires the following methods: method of theoretical generalization - during the study of scientific works, regulatory legal acts; abstractlogical - method to generalize the theoretical and methodical provisions, as well as to determine the purpose of the study; method of a systematic approach - the definition of directions for improving the functioning of Participatory Budgeting as an effective instrument for implementing budgetary policy. Results. The main components, which should include Participatory Budgeting process are

proposed, the purpose of which is to facilitate the establishment of a social dialogue between local authorities and residents of the territorial community, and to create conditions for the participation of the residents of the territorial community in the budgetary processes to meet their needs. The analysis of the conducted studies made it possible to determine the main risks and limitations of participatory budgeting. Practical implications. The main stages of the participatory budgeting process are outlined, in particular: the preparatory stage, the stage of budget formation and its approval, the main point of which is the establishment of a budget committee and the commencement of its work, the implementation stage, the stage of monitoring and evaluation of participatory budgeting. The main types of activity included in each stage have been studied. All of the above made it possible to develop a cycle of participatory budgeting as one of the directions of budgetary policy. We believe that the popularity of this process is determined by the benefits received by the residents, local authorities and the city in general. Value/ originality. Formation and implementation of budgetary policy at the local level in the current conditions of decentralization of power with the help of the developed cycle of implementation of Participatory Budgeting will promote the establishment of a social dialogue between local authorities and residents of the territorial community, creating conditions for the participation of residents of the territorial community in a transparent budgetary process to meet their needs.

190. Sustainable agriculture in conditions of climate changes: Possible problems and ways of their solving in the South Steppe zone of Ukraine / R. A. Vozhehova etc. *Ukrainian journal of ecology*. 2018. Vol. 8, Issue 3. C. 75-82. URL: https://apps.webofknowledge.com/full_record.do?product=WOS&search_mode=GeneralSearch&qid=3&SID=E59GQXtKOP6523rdO3H&page=2&doc=11&cacheurlFromRightClick=no.

Global warming inputs in agricultural production are considered to be valuable enough. The goal of our study was to determine possible consequences and main trends of climate changes in the Kherson region, Steppe zone of Ukraine. We used perennial meteorological data, gathered at the Kherson regional hydro-meteorological station, for assessment of climate processes in the region. Additionally, we calculated the most important for sustainable crop production meteorological indexes by using the modern methods and software application CROPWAT 8.0, such as effective rainfall amounts, evapotranspiration and moisture deficit. Evapotranspiration in the region in the period from 2005 to 2016 averaged to 4.3 mm/ha per day, that is quite high value of the index. We determined that evapotranspiration increase under the progressive air temperatures rise cannot be covered at the expense of natural humidification, although rainfall amounts are tending to increase too. Moisture deficit remains high enough and reached the maximum value of 680 mm/ha in 2014. Regression models of the processes in climate of the zone showed stable, weakly progressive trend to dryness increase (from 462 mm/ha of moisture deficit in 2005 to 502 mm/ha in 2016). The greater moisture deficit is, the greater demand for irrigation is. Ignoring this fact and taking no steps to solve the problem of irrigation would cause drastic decrease of crop production in the region. So, climate changes in the Kherson region should be taken in account when planning the development of sustainable crop production in the region in changeable biosphere conditions. We also suggest that development and application of modern irrigation methods, such as drip and subsurface ones, are a priority direction of agricultural production in the zone in connection with modern climate conditions and possible deterioration of water quality.

191. Water supply of soft winter wheat under dependent of it sorts features and sowing terms and their influence on grain yields in the conditions of the Southern Step of

Ukraine / M. M. Korchova etc. *Ukrainian journal of ecology*. 2018. Vol. 8, Issue 2. C. 33-38. DOI: 10.15421/2018_306.

It was established that with, by changing the sowing time from September 10th to October 20th, soil moisture content increased by 6-19 mm, depending on the sorts of wheat and meteorological conditions of the year. It has been proved that to achieve the lowest reserves of productive moisture, during the harvest of soft winter wheat in moderately wet years, the optimal sowing time was on September 10th and 20th, and in arid conditions on October 10th and 20th. On average, in 2011-2013, the largest amount of water (2615-2678 m(3)/ hectare) was consumed by soft winter wheat plants that were sown on September 10th. By postponing the sowing time by 10 days led to a decrease in this value 124-266 m(3)/hectare, depending on the features of sorts. The sort of soft winter wheat with the lowest total water consumption is the Odessa Blahodarka with 2349-2615 m(3)/hectare, this figure was formed according to the variety of Odessa Blahodarka, and the largest -2423-2678 m(3)/ha from the Podolyanka sort. Studies had shown that in arid condition during 2012, compared to more favorable conditions in 2013, the yield of the studied sorts decreased to 42.1-100% depending on the sowing times. It was established that with postponing the sawing times from September 10th to October 10th, the yield level of the studied sorts increased from 2.83 t/ha to 3.90 t/ha. By sowing on October 10th, the coefficient of water consumption of soft winter wheat was 572.2 m(3)/t on average for sots of wheat, which is 65.3 m(3)/t more than sawing on September 30th.

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192. Assessing genomic taurine/zebuine admixture in the southern meat cattle based on microsatellite markers / A. S. Kramarenko etc. *Ukrainian Journal Of Ecology*. 2019. Vol.

9. Issue 1. C. 251-261. WOS:000467089700036.

Hybridization between wild and domestic bovine species occurs worldwide either spontaneously or by organized crossing. The Southern Meat (SM) cattle is a composite developed by crossing Cuban zebu (Bos indicus) with different cattle breeds (Bos taurus) - local Red Steppe, Hereford, Charolais, Santa Gertrudis, Dairy Shorthorn. The main aim of this work was to study the genetic structure of the Southern Meat breed (SM) cattle and to assess the taurine/zebuine admixture in the SM population using microsatellites. A set of 192 heifers representing the SM cattle (the 'Askaniiske' State Pilot Farm, Kherson region, Ukraine) was included in the study during 2013-2014. Based on the origin of the individuals studied, all heifers were attributed to two groups according to the different degree of Zebu blood: the LZ group (<= 3/8 percent Zebu blood; n= 100) and the UZ group (> 3/8 percent Zebu blood; n= 92). Ten bovine autosomal polymorphic microsatellite loci (BM1818, BM1824, BM2113, ETH3, ETH10, INRA023, TGLA53, TGLA122, TGLA227 and SPS115) were genotyped to estimate various parameters of genetic diversity. The total number of genotype estimates ranged substantially over loci from 18 (locus BM1824) to 37 (locus INRA023), giving a mean number of 27.9 +/- 1.96 genotypes per locus. Overall, one hundred and four alleles were observed across the 10 microsatellite markers examined, with allelic diversity (the average number of observed alleles per locus) of 10.4 +/- 0.76. Significant difference (P< 0.05-0.001) was found between the LZ and UZ groups with regard to distribution of allele frequencies across all loci. The values of Ae, Ho, He and Fis in two SM cattle groups did not differ significantly (a non-parametric paired Wilcoxon's test; for all cases P> 0.05). At each locus some alleles were identified that were present at higher frequencies in the LZ group and absent or present at relatively lower frequencies in the UZ group, or vice versa. Evidence for an association between specific alleles at every locus with B. indicus/B. taurus breed was assessed by using

a Logistic Regression model. Significant relationship was discovered only for two loci, TGLA227 (chi(2)= 22.30; P< 0.001) and ETH10 (chi(2)= 27.70; P< 0.001). It can be assumed that the TGLA227 (77 bp) and ETH10 (209-211 bp) alleles among the SM cattle examined individuals were inherited from a B. indicus ancestor. On the other hand, the TGLA227 (89 bp) and ETH10 (217-219 bp) alleles which prevails among individuals in the LZ group were inherited from a B. taurus ancestor. Thus, the SM cattle presented with high level of taurine/zebuine admixture, which is consistent with the breeding history.

193. Behavioral Approach To Monitoring The Financial Security Of State / N. Sirenko etc. *Management Theory And Studies For Rural Business And Infrastructure Development.* 2019. Vol. 41. Issue 1. C. 102-112. DOI: 10.15544/mts.2019.10.

Monitoring of financial security of the state in the current dynamic conditions of increasing financial globalization occurs with the growing role of the human factor, which occupies a central place in the behavioral approach and substantiates the relevance of this study. The purpose of the article is to formulate the relationship between the behavior of participants in financial relations, their gender balance, the introducing a behavioral approach for monitoring the state of financial security and its level. The methodic of work is based on the usage of the expert estimation method, which made it possible to analyze gender differences in the views of economists of financial security and politics, the scientific positions of male and female economists who work in institutions of higher education and have academic degrees. The results of the study indicate a largest average statistically significant difference between the points of view of women and men is fixed on the following issues: the issue of taxation; attitude towards risk; distribution of budget funds; gender gaps; behavioral aspects. The degree of dependence between the be-

havior of participants in financial relations, their gender balance and level of financial security, which confirms the need to introduce a behavioral approach for monitoring of financial security of the state, is established.

194. Changes in enzymatic activity of the arable soil layer under different systems of primary tillage and fertilization of typical chernozem in the short crop rotation of the right-bank foreststeppe zone of Ukraine / I. Prymak etc. *Ukrainian journal of ecology*. 2019. Vol. 9. Issue 2. C. 14-20. WOS:000499384200003.

The highest activity of invertase, urease, phosphatase, dehydrogenase and polyphenol oxidase in the arable layer of typical chernozem was observed when applying a moldboard -subsurface tillage in the crop rotation, the lowest-under a shallow disk tillage. The highest protease activity was in the moldboard tillage, peroxidase-in the beardless tillage, and catalase-in the disk tillage, while the lowest correspondent indices were recorded in the permanent shallow (10-12 cm), moldboard and differentiated tillage in the crop rotation. Phosphatase activity of the arable layer did not differ significantly between the beardless and disk tillage. Indices of the peroxidase activity were almost at the same level for the chisel and differentiated tillage. Localization of plant remains and organic fertilizers in the upper soil layer in the beardless and disk tillage leads to the increasing activity of enzymes. The highest coefficient of humus accumulation was recorded in the moldboard-beardless, the lowest-in the disk tillage. Fertilizers raise the soil enzymatic activity. A differentiated system of primary tillage in the crop rotation is recommended, which includes plowing to a depth of 25-27 cm for the sunflower, beardless tillage for the maize and soybeans (25-27 and 16-18 cm, respectively) and shallow (10-12 cm) tillage by a disk harrow for the rest of crops in the rotation. It is proposed to use 12 tons of manure+N95P82K72 per one hectare of the arable land.

195. Fedosieieva H. Sustainable Development Of Agricultural Producers Is A Condition For Their Successful Functioning In The World Market. *Baltic Journal Of Economic Studies*. 2019. Vol. 5. Issue 1. C. 218-223. DOI: 10.30525/2256-0742/2019-5-1-218-223.

Substantiation of a holistic system of goals of steady development of agricultural producers on the conditions of their successful functioning in the world market taking into account global and local trends in the development of the world economy, peculiarities of agricultural activity in Ukraine, and directions of development of the world agricultural market. The methodology of research. The reliability of the study is due to the use of an integrated approach and a significant set of research methods, in particular: systematic approach - in studying the connections between phenomena and processes in the system of formation of a holistic system of steady development of agricultural producers on the conditions of their successful functioning in the world market; monographic - for a comprehensive and in-depth study of the peculiarities of the modern manifestation of the key factors of sustainable development of agricultural producers, provided that they operate in the world market; dialectical and abstract-logical - when conducting theoretical generalizations and forming conclusions; the method of scientific abstraction - with a selection of key factors that determine the steady development of agricultural producers; etc. Findings. Considered the main goals of sustainable development on the basis of values, principles, and key factors of the development of the world economy. Determined the main global tendencies of development of the world agricultural market. On the basis of the study, an integrated system of goals for the steady development of agricultural producers in the conditions of their functioning in the world market has been formed. It is noted that the basis of the sustainable development of any system is a combination of economic development with a minimal negative impact on the environment and the socialization of newly created economic

transformations. Originality. The integrated system of goals of steady development of agricultural producers in the world market, which includes three interconnected blocks: economic, social and ecological, for which each priority is defined, is substantiated. The main conditions for achieving these goals are presented. Practical implications. The obtained results can be used in substantiating directions of the formation of stable competitive advantages of agricultural producers in the world market.

196. Havrysh. V., Nitsenko V., Bilan Y., Streimikiene D. Assessment of optimal location for a centralized biogas upgrading facility. *Energy & Environment*. 2019. Vol. 30. Issue 3. C. 462-480. DOI: 10.1177/0958305X18793110.

Since the 1990s, the volume of biogas produced in the world has been increasing. Biomethane (upgraded biogas) is a more versatile renewable fuel. Biogas transportation from production sites to upgrading facilities induces a scale advantage and an efficiency increase. Therefore, exploration of costs and energy use of biogas transportation using dedicated infrastructure is needed. A mathematical model to determine the optimum location for a certain biogas upgrading plant has been presented. It was developed to describe a local biogas grid that is used to collect biogas from several digesters and to deliver it to a central upgrading point. The model minimizes operational and maintenance costs per volumetric unit of biogas. The results indicate that cooperation between biogas producers in collecting biogas by means of a star layout reduces the cost of biomethane production (investment costs by 22.4-24.8% and operating and maintenance costs by 1.7-10.9%) relative to using a decentralized method. Merging smaller digesters into a smaller number of larger biogas upgrading plants reduces the biomethane production costs for the same biogas volume source.

197. Kalinichenko A., Havrysh V. Feasibility study of biogas project development: technology maturity, feedstock, and utilization pathway. *Archives Of Environmental Protection*. 2019. Vol. 45. Issue 1. C. 68-83. DOI: 10.24425/aep.2019.126423.

Biogas production has a big potential to provide clean energy. To evaluate the future production and maturity of biogas technology the generalized Weng model was proved to be effective, due to it has the minimum error. The simple algorithms to determine its parameters have been proposed. The simulation results for China. USA, and EU have been presented. The quantity and quality analysis for biogas feedstock has been carried out. Energy Return on Energy Invested (EROEI) indicator for different biofuels was considered. According to analysis done biogas from maize residue and chicken manure has high EROEI. Shannon Index was suggested to evaluate the diversity of feedstock supply. Biomass energy cost indicator was grounded to be used for feedstock energy and cost assessment. Biogas utilization pathways have been shown. Biogas boilers and CHP have the highest thermal efficiency, but biogas (biomethane) has the highest potential to earn as a petrol substitute. Utilization of biogas upgrading by-product (=bon dioxide) enhances profitability of biogas projects. Methods to assess the optimal pathways have been described.

198. Korkhova M., Panfilova A., Chernova A., Rozhok O. The Effect Of Pre-Sowing Seed Treatment With Biopreparations On Productivity Of Cultivars Of Triticum spelta L. *Agrolife Scientific Journal*. 2019. Vol. 8. Issue 1. C. 120-127. WOS:000469997600015.

The article presents the results of scientific research devoted to the study of the productivity of spelt wheat depending on the varietal characteristics and pre-sowing treatment of seeds with biopreparations. Field tests were carried out during

2016-2018 on the experimental field of the Educational, Scientific and Practical Center of the Mykolaiv National Agrarian University in four repetitions by the method of the split sites. It was studied the influence of varietal characteristics and pre-sowing seed treatment with Organic-balance and Liposam biopreparations on the main elements of productivity of winter wheat spelt in conditions of southern Ukraine. We found that all the studied factors had an impact on grain yield and the main elements of spelt wheat productivity. The largest number of productive stems (780 PCs/m(2)) and the highest height (131.5 cm) were formed by plants of the variety Zorya Ukrainy in the variant with pre-sowing treatment of seeds Organic-balance (1 l/t) + Liposam (0.3 l/t). We also determined that factor B (presowing treatment of seeds with biopreparations) did not significantly affect the formation of the main elements of the ear productivity, while factor A (varieties) had a significant impact. The most productive ear was at the Europa plant variety in the variant of pre-sowing seed treatment with Organic-balance + Liposam: ear grain content was 32.3 PCs the weight of the grain on 1 spike was 1.26 g. 1000 seeds weight was formed on the variety Zorya Ukrainy as 46.3 up to 47.0 g depending on pre-sowing seed treatment with biopreparations. It was found that the highest yield of spelt wheat (5.74 t ha(-1)) was obtained by sowing the variety Europa in the variant with pre-sowing treatment of seeds with Organic-balance and Liposam, but the difference between the first variant of seed treatment (Organic-balance) was insignificant.

199. Kotykova O., Kuzmenko O., Semenchuk I. Sustainable Agricultural Land Use In The Post-Socialist Camp Countries: Monitoring And Evaluation. *Baltic Journal Of Economic Studies*. 2019. Vol. 5. Issue 1. C. 101-111. DOI: 10.30525/2256-0742/2019-5-1-101-111.

The purpose of the article - to carry out the monitoring and evaluation of agricultural land use sustainability in the post-socialist camp countries. Methodology. During the study,

the following methods were used: dialectical, abstract and logical, system analysis, index, and graphical comparison. Monitoring and evaluating of the agricultural land use sustainability involves periodic tracking relevant indicators based on available official statistics, central authorities' information, local authorities and carrying out, on the basis of monitoring, the ranking in the post-socialist camp countries by comparing the obtained results with their best values. Monitoring and evaluating of the agricultural land sustainability conducted to monitor the process of sustainable agricultural development goals implementation, problems' identification of regions agricultural land use and their causes, improving the efficiency of administrative decisions of central executive authorities, local authorities and the land market actors. Elements of scientific innovation. Existing methods for determining the integral indicator for comparing the land use sustainability and own method was suggested, by which the relevant calculations and conclusions were made. The proposed methodology ensures the implementation of appropriate objectives and indicators for monitoring the Global Sustainable Development Goals 2016-2030 achievement in Ukraine. Practical significance. The availability of the integral environmental and economic indicators at the macro level is ideal for people who make decisions in terms of consideration of the environmental factors on the country's development. The main goal of an integral indicator for comparing the sustainability of land use development in the regions of Ukraine creating is to ensure the possibility of ranking these regions in order of their total potential decreasing and thus defining "depressed" for providing the state aid to them. Conclusions. According to the given methods, it has been proved that agricultural land use in the countries of the post-socialist camp has a positive dynamics but the sustainability indicators for all indicators have not achieved yet. It has been defined that Estonia, Latvia, and Slovenia got the first three places; and Croatia, Lithuania, and Romania got

the last places in the ranking of sustainability of the agricultural land use for the countries of the post-socialist camp. In accordance with settlements for solving the problems in the area of agricultural land use, the state should focus on less developed regions where the environmental situation is difficult, productivity and land return reduced, slowed population growth, and which have an excessive migration.

200. Lagodiienko V. V., Lagodiienko N. V. Modeling The Assessment Of Innovation Capacity Of Industrial Enterprises. *Financial And Credit Activity - Problems Of Theory And Practice*. 2019. Vol. 1. Issue 28. C. 280-289. WOS:000464712800030.

The paper identifies the level of innovation capacity using Harrington's desirability function. The main hypothesis of the study is based on the assumption that the level of readiness of industrial enterprises for development on the basis of innovations differs in the context of economic activity types. In turn, it requires a comprehensive assessment of innovation capacity taking into account a plurality of factors that determine it. A ranking of the types of economic activity in industry has been performed on the value of the integral indicator, calculated on the basis of a set of indicators that fully reflect the degree of readiness of enterprises in a particular industry to innovate. The comprehensive assessment of the innovative capacity of Ukrainian industrial enterprises has revealed a satisfactory and good ability to innovate. The leading industries, whose enterprises have rather high indicators of innovation capacity, include the production of motor vehicles and the pharmaceutical industry. Outsiders in the rating of innovation capacity are enterprises that produce coke and products of oil refining; supply of electricity, gas, steam; water supply. By the partial functions of desirability, factors were identified which determined certain positions of enterprises of different industries in the rating. It is established that the advantages of the enterprises, belonging to the leading industries, are achieved due

to the high level of innovation costs and their share in the total expenses of enterprises, as well as the active introduction of innovative products into production. Low positions in the innovation capacity rating are mainly due to a small percentage of subjects engaged in the innovative products development, their implementation and the introduction of innovations. The use of the developed model enables, in addition to the identification of the innovation capacity level of enterprises, to determine the trends of its development in dynamics, to find the enhancement reserves, as well as to identify the main directions of implementation of the innovation development strategy in accordance with the established position of an individual entity or industry, which may be further investigated in the study.

201. Lagodiienko V., Lagodiienko N. Empirical Analysis of the Effectiveness of the Free Trade Area between the EU and Ukraine for the Agricultural Market. *Tem Journal-Technology Education Management Informatics*. 2019. Vol. 8. Issue 3. C. 915-920. DOI: 10.18421/TEM83-32.

The article presents the evaluation of the effectiveness of a deep and comprehensive free trade area between Ukraine and the European Union for the agro-food products. The dynamics of comparative advantages of agro-food products of Ukraine in the context of separate groups with the use of the modified Balassa index is analyzed. It has been established that the improvement of competitive positions after the introduction of the free trade area is observed in the most types of products among those with identified comparative advantages on the European market. The positive influence of the progress within trade and economic cooperation between Ukraine and the EU on the competitive position of agro-food products at the European market is substantiated.

202. Mudrak R., Nyzhnyk I., Lagodiienko V. Lagodiienko N. Impact of Seasonal Production on the Dynamics of

Prices for Meat and Dairy Products in Ukraine. *Tem Journal-Technology Education Management Informatics*. 2019. Vol. 8 Issue 4. C. 1159-1168. DOI: 10.18421/TEM84-08.

There are seasonal deficits during the year in the meat and dairy product markets that lead to an increase in consumer prices. The calculated coefficient of elasticity showed that prices increase by 0.05%, with a decrease in the monthly supply volumes of meat by 1%. The calculated coefficients of elasticity indicate that the consumer price index for drinking milk, cheese and butter increases by 0.24, 0.12 and 0.13%, respectively, and with a decrease in the production of milk raw materials by 1%.

203. New findings of pest sciarid species (Diptera, Sciaridae) in Ukraine, with the first record of Bradysia difformis / A. I. Babytskiy etc. *Biosystems Diversity*. 2019. Vol. 27. Issue 2. C. 131-141. DOI: 10.15421/011918.

Sciarids (Diptera, Sciaridae) or black fungus gnats are small, mainly dark coloured insects whose larvae usually develop in rotting plant remains permeated by fungal hyphae. Typical habitats for sciarids are shaded forests and wet meadows, but some species can migrate from natural biotopes to anthropogenic ecosystems and live as synanthropes. Synanthropic sciarid species in the case of their larvae mass development, may cause significant damage to agricultural plants and mushrooms and are considered as pests. The information on pest activities of sciarids in the literature is provided for 34 species, but only 7 species can be considered as dangerous pests. In the framework of taxonomic and ecological research on Sciaridae in Ukraine, some chorological and faunistic peculiarities of pest sciarids have been studied. We collected material during the expeditions and excursions in different biotopes of Ukraine from 2012 to 2018 using the Malaise trap, by the method of non-count sweeping with entomological net and with ex-

hauster directly from substrate. The collected imagoes were placed into 5 mL vials with 70% ethanol. In the lab, the fixed material was dehydrated in absolute ethanol and mounted on slides in Euparal. All of the studied material is kept in Andriy Babytskiy's Private Collection, Kyiv (PABK) and mostly availible to the public on the UkrBIN. In Ukraine 4 species of harmful sciarid pests from 3 genera are recorded, namely Bradysia brunnipes (in Crimea), B. difformis (in Kyiv and Volyn Regions), Lycoriella ingenua (in Kyiv and Volyn Regions) and Pnyxia scabiei (Western regions excluding the Carpathians). B. brunnipes, also known as "cucumber gnat", is one of the widespread cucumber pests in greenhouses, damaging roots and above-ground shoots of cucumbers. In Ukraine, mass development of this species and significant loses of the harvest caused by it have not been reported. B. difformis is a widespread pest sciarid, but in Ukraine it has been recorded for the first time. The mass development of this species was recorded in hothouses with cacti and other succulent plants at the O. V. Fomin Botanical Garden, where the larvae of B. difformis cause significant damage to these plants, especially to their sprouts. L. ingenua is the most common sciarid pest which damages mushrooms in hothouses. In Ukraine it was massively recorded in cellars and on vegetables in storages. P. scabiei was recorded in Western Ukraine, except the Carpathians, as a potato pest species that damages sprouts in the fields and tubers in storages. Considering the absence of records of P. scabiei in natural biotopes of Ukraine, it is likely that this species was introduced to our country from America together with potatoes and should be recognized as an alien species to the natural entomofauna of Ukraine.

204. Pedagogical Model Of Preparation Of Future Engineers In Specialty "Electric Power, Electrical Engineering And Electrical Mechanics" With Use Of Massive Online Courses / V. V. Oliynyk etc. *Information Technologies And*

Learning Tools. 2019. Vol. 73. Issue 5. C. 161-173. WOS:000493918100012.

The article presents an experimental model of training future engineers in specialty"Electric Power Engineering, Electrical Engineering and Electromechanics"in conditions of massive open online courses (MOOC). The article reveals the concepts of modeling, designing and validity in pedagogy. The stages of construction of the pedagogical model are presented. Four blocks of the model of training the students in specialty"Electric Power Engineering, Electrical Engineering and Electromechanics"for educational and scientific activities in the conditions of MOOC are presented: motivational, content and procedural, technological and productive. The motivational block is characterized by the definition of the main goals of the introduction of pedagogical technology: the preparation of a highly qualified specialist. The content and procedural block is based on the implementation of pedagogical conditions of educational and scientific training The technological block consists of three stages: motivational, cognitive-procedural and control-evaluation. The productive block provides monitoring of educational and scientific training of students in the specialty "Electrical power, electrical engineering and electromechanics". It is determined that there is feedback between all blocks of the model, which allows to make changes in the content, forms and methods of teaching. The principles of construction and the main structural elements of each of the blocks are analyzed. The general principles for the training of future engineers in specialty "Electric Power Engineering, Electrical Engineering and Electromechanics" are determined in conditions of MOOC; forms, methods and means of instruction are described. It is considered that educational and scientific training is implemented through such forms of teaching as lectures, video lectures, webinars, workshops, video conferences, discussion in forums, participation in scientific conferences and seminars. It is deter-

mined that the result of the developed model is readiness of the students majoring in "Electric Power Engineering, Electrical Engineering and Electromechanics" for research and study.

205. Sirenko N., Burkovska A. Lunkina T. Mikulyak K. Prospects For Organic Production Development In The Market Environment. *Management Theory And Studies For Rural Business And Infrastructure Development*. 2019. Vol. 41. Issue 3. C. 318-331. DOI: 10.15544/mts.2019.26.

The main objective of the study is to analyze the factors that determine and stimulate organic production in Ukraine, as well as study the experience of the EU countries regarding the peculiarities of organic production development and to identify areas for improvement of domestic legislation to develop the organic sphere. Methodological tools: statistical, retrospective, graphical research methods, which have been used to assess the state of organic agriculture in Ukraine and identify factors that stimulate its development. The study period covers the years 2002-2018. The study of the prospects for the development of organic production in a market environment is carried out in the following logical sequence: the features of the development of organic movement in the world are revealed; the dynamics of changes in the area of agricultural land and the number of agrarian enterprises in 2002-2018 was researched, an analysis of the dynamics of the consumer organic market in Ukraine was conducted; The rating of European countries on agricultural land occupied by organic products is given; a comparative analysis of the main organic food products with the traditional ones was conducted; the mechanism of the basic requirements for acquiring the status of producer of organic products is developed; the forecast of the total area of organic agricultural land in 2019 is carried out.

206. Vinarski M. V., Kramarenko S. S. Scale-dependence in geographic variation in a freshwater gastropod across the Palearctic. *Molluscan Research*. 2019. Vol. 39. Issue 2. C. 159-170. DOI: 10.1080/13235818.2018.1497570.

The reality of spatial clinal variation in morphological traits of freshwater pulmonate snails (Gastropoda: Pulmonata) has repeatedly been questioned or totally discounted. There is a lack of sound statistical evidence in the articles hitherto published on this subject supporting these claims. Here, by means of different analytical methods (analysis of spatial autocorrelation, linear regression analysis, canonical correlation analysis and others), we demonstrate that shell variation in the dwarf pond snail, Galba truncatula, is patterned in space throughout the northern and central Palearctic, with latitudinally-oriented clines in body size and in some shell proportions. Shell size in G. truncatula decreases with latitude and temperature, representing a special case of converse Bergmann cline. However, the temperature itself is hardly the main driver of shell size variation. It is argued that the shorter growing seasons at high latitudes may represent a better explanation for the observed trend. Shell proportions in the dwarf pond snails vary weakly at the macrogeographic scale, being spatially patterned at lower (mesogeographic) scales around 1200-1500km. In general, spatial variation in G. truncatula shell size is decoupled from variation in shell shape, demonstrating clear scale-dependence similar to that found in different species of terrestrial (non-aquatic) pulmonate snails.

207. Zhukov O. V., Kovalenko D. V., Kramarenko S. S., Kramarenko A. S. Analysis of the spatial distribution of the ecological niche of the land snail Brephulopsis cylindrica (Stylommatophora, Enidae) in technosols. *Biosystems Diversity*. 2019. Vol. 27. Issue 1. C. 62-68. DOI: 10.15421/011910.

The aim of our work is to describe the ecological niche of the land snail Brephulopsis cylindrica (Menke, 1828) in terms of the edaphic properties and properties of the vegetation cover and to show the spatial features of the variation of the habitat preference index within the artificial soil body - technosols (soddy-lithogenic soils on loess-like clays) using the ecological niche factor analysis (ENFA). The research was carried out at the Research Centre of the Dnipro Agrarian and Economic University in Pokrov. Sampling was carried out on a variant of artificial soil (technozems) formed on loess-like clays. The test site where the sampling was conducted consists of 7 transects of 15 samples each. Test points form a regular grid with a mesh size of 3 m. Soil mechanical impedance, aggregate-size distribution, soil electrical conductivity, vegetation physiognomic characteristics, and Didukh phytoindication scales were used as ecogeographic predictors of the mollusc's ecological niche properties. Phytoindication assessment indicates that the technosol ecological regimes are favourable for sub-mesophytes, hemi-hydrocontrastophiles, neutrophiles, semieutrophs. The test for statistical significance showed that an axis of marginality of the ecological niche of B. cylindrica and axes of specialization are significantly different from the random distribution. We found that the ecological niche of the mollusc is determined by both edaphic factors and ecological features of vegetation. The marginality of B. cylindrica ecological niche over the entire period of study is determined mainly by preferences for physiognomic vegetation types, higher values of the continentality and thermality regimes. Often greater content in the soil of aggregates 1-3 mm in size coincides with greater numbers of B. cylindrica individuals. Individuals of this species avoid physiognomic type III and areas with higher soil alkalinity and mineralization detected both by means of the phytoindication approach and soil electrical conductivity data. Ecological niche optima may be presented

by integral variables such as marginality and specialization axes and plotted in geographic space. The spatial distribution of the B. cylindrica habitat suitability index (HSI) within the technosols is shown, which makes it possible to predict the optimal conditions for the existence of the species.

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