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| УДК 639.2.081.7:681.883.4  **T.Z. Lobova, A.P. Belash**  **IMPROVEMENT OF MATHEMATICAL MODEL OF ANTENNA LATTICE**  **TO DETERMINE CONCENTRATION OF PELAGIC FISHES**  To determine the density of pelagic and ground fish in various fishing basins hydroacoustic methods are commonly used [1]. In assessing the number of fish, reflected signals from the bottom of sea cause a big mistake. To increase the accuracy, it is necessary to know the acoustic characteristics of the water and the ocean bottom, ρ*c* (density, velocity). However, the existing methods of computing the field with inhomogeneity in the angle of acoustic characteristics (the bottom, the surface of the ocean) lead to unacceptably long calculation time. For example, it takes up to several hours on a medium-performance computer. A mathematical algorithm based on the theory of Green's functions with angular dependence is proposed. This angular dependence makes it possible to isolate patches at boundaries having a homogeneous structure. The possibilities of the algorithm are demonstrated by the example of an analysis of the antenna lattice field located inside the marine wedge. The time for calculating the field inside the marine wedge on a medium-performance computer has been approximately 10–20 seconds. Calculation models are obtained in a curvilinear coordinate system. Numerical experiments showing the applicability of the deduced mathematical model for practical calculations have been carried out. The error in calculation model does not exceed 10%. The approximate calculation methods considered allow us to carry out engineering calculations of antennas located in the shallow sea.  **Key words**: Green's functions, mathematical model of calculation, hydroacoustic field, directivity diagram, errors, antenna lattice, mathematical algorithm, reflection coefficient, density, velocity.  *DOI: 10.17217/2079-0333-2018-43-6-12*  **Information about the authors**  **Lobova Tatyana Zhanovna** – Far Eastern Federal University; 690950, Russia, Vladivostok; Postgraduate of Instrumentation Chair; daydream\_2012@mail.ru  **Belash Aleksey Pavlovich** – Kamchatka State Technical University; 683003, Russia, Petropavlovsk-Kamchatsky; Associate Professor of Ship Navigation Chair |
| УДК 628.16.067.1:637  **A.V. Mangazeev, V.V. Potapov, D.S. Gorev**  **CERAMIC MEMBRANES FOR CONCENTRATION OF MILK WHEY**  The need of dairy industry in deep purification of waste water is increasing steadily. A large part of the waste water makes up products of curd and cheese – milk whey. Including the high-tech membrane processes to reduce the amount of milk whey concentrate will significantly reduce the volume of serum required for disposal. Experiments have been performed on membrane concentrated cottage milk whey with ceramic membranes. Samples of the filtrate achieved a significant reduction in negative substances. The results of the experiment confirm the possibility of using microfiltration membranes in purification systems for the treatment of waste water at dairy plants.  **Key words:** membrane selectivity and permeability, curd milk whey, dry matter, protein, fat.  *DOI: 10.17217/2079-0333-2018-43-13-21*  **Information about the authors**  **Mangazeev Aleksandr Vladimirovich** – Kamchatka State Technical University; 683003, Russia, Petropavlovsk-Kamchatsky; Postgraduate; mang1976@mail.ru  **Potapov Vadim Vladimirovich** – Scientific Research Geotechnological Centre FEB RAS; 683003, Russia, Petropavlovsk-Kamchatsky; Doctor of Technical Sciences; Professor, Chief Researcher  **Gorev Denis Sergeevich** – Scientific Research Geotechnological Centre FEB RAS; 683003, Russia, Petropavlovsk-Kamchatsky; Candidate of Technical Sciences; Senior Researcher; denis.goreff2015@yandex.ru |
| УДК 519.6:550.510.413.5"2015"  **O.V. Mandrikova, Y.A. Polozov, T.L. Zalyaev**  **JOINT ANALYSIS OF IONOSPHERIC PARAMETERS AND COSMIC RAY DATA DURING PERIODS OF MAGNETIC STORMS IN 2015**  The work analyzes ionospheric parameters and cosmic ray data during periods of strong magnetic storms of 2015. The analysis is based on methods developed by the authors using wavelet transform and neural networks. On the eve of magnetic storms, anomalous increases in the cosmic ray data and the increase in the electron density of the ionosphere arising during these periods, which are probably related to the approaching events, have been identified.  The research was supported by RSF Grant, project No 14-11-00194-П.  **Key words:** wavelet transform, magnetic storm, ionospheric parameters, cosmic rays, Forbush-effects.  *DOI: 10.17217/2079-0333-2018-43-22-29*  **Information about the authors**  **Mandrikova Oksana Viktorovna** – Institute of Cosmophysical Researches and Radio Wave Propagation FEB RAS; 684034, Russia, Kamchatka Region, Elizovsky District, Paratunka; Doctor of Technical Sciences, Head of System Analysis Laboratory; oksanam1@mail.ru  **Polozov Yuriy Aleksandrovich** – Institute of Cosmophysical Researches and Radio Wave Propagation FEB RAS; 684034, Russia, Kamchatka, Elizovskiy District, Paratunka; Candidate of Technical Sciences, Senior Researcher of System Analysis Laboratory; up\_agent@mail.ru  **Zalyaev Timur Lenarovich** – Institute of Cosmophysical Researches and Radio Wave Propagation FEB RAS; 684034, Russia, Kamchatka Region, Elizovskiy District, Paratunka, Junior Researcher of System Analysis Laboratory; tim.aka.geralt@mail.ru |
| УДК 550.388:621.396  **V.P. Sivokon, I.M. Voroshilov, A.E. Masharova, E.V. Matanskaya**  **GEOPHYSICAL FACTOR OF EFFECTIVENESS ON IONOSPHERE**  For data transfer to vessels in high latitudes decametric communication channels are widely used. For increasing their efficiency the mechanism of waveguide ionospheric propagation can be used. Realisation of this mechanism is possible through the creation of artificial ionosphere irregularities under active influence of powerful short-wave radiation on it. Owing to small, in comparison with natural processes, energy effects, it is necessary to consider heliogeophysical conditions which are dynamic. Based on the analysis of experiments conducted in October-November of 2017 on high-power heating facility in Tromso, the attempt is made to estimate the possibility of using high-power heating technologies for forming the conditions of waveguide propagation of decametric waves in the ionosphere. With that for the first time potentialities of software defined radio are used.  **Key words**: ionosphere, field-aligned irregularities, propagation of radio-waves.  *DOI: 10.17217/2079-0333-2018-43-30-36*  **Information about the authors**  **Sivokon Vladimir Pavlovich** – Kamchatka State Technical University; 683003, Russia, Petropavlovsk-Kamchatskу; Institute of Cosmophysical Research and Radio Wave Propagation FEB RAS; Doctor of Technical Sciences, Professor of Electrical and Radio Equipment of Ships Chair; vsivokon@mail.ru  **Voroshilov Ivan Mikhailovich** – Kamchatka State Technical University; 683003, Russia, Petropavlovsk-Kamchatskу; Student  **Masharova Anastasia Evgenievna** – Kamchatka State Technical University; 683003, Russia, Petropavlovsk-Kamchatskу; Student  **Matanskaya Elvira Viktorovna** – Kamchatka State Technical University; 683003, Russia, Petropavlovsk-Kamchatskу; Student |
| УДК 532.529  **A.N. Shulyupin, A.A. Chermoshentseva, I.I. Chernev**  **METASTABLE FLOW IN STEAM-WATER GEOTHERMAL WELL**  The article deals with the special case of flow in a steam water well, when the condition of stability for the well is not fulfilled on the whole, but on the wellhead, there are no conditions for development of instability (metastable flow). Тhe stability condition of the flow element pipe with an abrupt change of diameter is examined. It is show that the diameter change does not affect the overall condition of stability. Numerical calculations have revealed the existence of metastable flow in wells 4-E and A-3 of the Mutnovsky geothermal field transferred in a stable state by the method of throttling at the wellhead. For averaged well of the Pauzhetskoye field of the parohydrotherm by numerical calculations it is shown that in the upper part of the wellbore the flow has internal stability, which can also be a barrier to the development of instability in the well as a whole. It is established that at low mass flow rate internal instability spreads along the length of two-phase flow and at high mass flow rate internal instability is absent.  **Key words:** geothermal energy, steam-water wells, instability, two-phase flow, metastable flow.  *DOI: 10.17217/2079-0333-2018-43-37-43*  **Information about the authors**  **Shulyupin Aleksandr Nikolaevich** – Mining Institute FEB RAS; 680000, Russia, Khabarovsk; Doctor of Technical Sciences, Docent, Deputy Director for Science and Innovations; ans714@mail.ru  **Chermoshentseva Alla Anatolevna** **–** Kamchatka State Technical University; 683003, Petropavlovsk-Kamchatsky; Candidate of Technical Sciences, Associate Professor of Higher Mathematics Chair; allachermoshentseva@mail.ru  **Chernev Ivan Ivanovich** – JSC «Geotherm», 683009, Russia, Petropavlovsk-Kamchatsky; Candidate of Technical Sciences; Deputy Chief Engineer for Recourses |
| УДК663:664  **A.V. Aleshkov, K.G. Zemlyak, A.V. Zhebo**  **LACTULOSE SYNERGETIC MULTIEFFECTS IN THE ENRICHED FOOD**  The purpose of the article was the research of lactulose synergetic interaction with other ingredients, including functional, as a part of the enriched foodstuff. The synergetic effect was studied on the example of the patented developments of the group of authors including meat, dairy, fruit and berry and fatty products of functional purpose. As methods of the research the standardized and standard help techniques were applied. The obtained data on the mechanism and the results of synergetic interaction of lactulose with other functional food ingredients can be used in the creation of the enriched products for improvement of their organoleptic, functional and technological, physiological properties, decrease in content of nutritional supplements and other directed improvement of food quality.  **Key words:** synergetic effect, functional products, functional food ingredients, enriched foods, lactulose.  .  *DOI: 10.17217/2079-0333-2018-43-44-54*  **Information about the authors**  **Aleshkov Aleksey Viktorovich** – Khabarovsk State University of Economics and Law; 680000, Russia, Khabarovsk; Candidate of Technical Sciences, Docent, Associate Professor of Commodity Research Chair; aleshkov@inbox.ru  **Zemlyak Kirill Grigorevich** – Khabarovsk State University of Economics and Law; 680000, Russia, Khabarovsk; Candidate of Technical Sciences, Docent, Associate Professor of Commodity Research Chair; firnfjord@yandex.ru  **Zhebo Anna Vladimirovna** – Khabarovsk State University of Economics and Law; 680000, Russia, Khabarovsk; Candidate of Technical Sciences, Docent, Head of Commodity Research Chair; anizotova@yandex.ru |
| УДК 664.8.022.6:634  **N.B. Eremeeva, N.V. Makarova**  **EFFECT OF PRETREATMENT OF FRUIT AND BERRIES WITH ENZYME PREPARATIONS ON YIELD AND ANTIOXIDANT ACTIVITY OF THE EXTRACTS**  One of the priorities in the development of technology of food industry is to develop innovative technologies for processing fruit and berry raw materials through the establishment and application of highly effective biotechnological methods of processing of raw materials, intensifying production processes, reducing energy consumption and providing high quality food products. In this paper, we investigate the influence of enzyme preparations on chemical composition and yield of fruit and berry extracts. A series of experiments in which before the preparation of the extract the fruits and berries were pre-treated with enzymes was conducted. In the course of the experiment three enzyme preparations: Pectinex® BE XXL, Pectinex® Yieldmash Extra, AmylaseTM AG 300 L. were used. There was a trend of increasing content of phenolic substances in extracts with enzyme preparation pre-treatment from 120,8% (black currant, Pectinex® Yieldmash Extra) up to 146,5% (raspberry, Pectinex® Yieldmash Extra) compared to the control sample. The greatest increase in yield for all fruits and berries occured when using enzyme preparation Pectinex® Yieldmash Extra for black currant there was an increase of 1,37 times, for raspberry – 1,36, for cherry – 1,49, for black chokeberry – 1,40.  **Key words:** extraction, enzyme preparations, fruit-berry raw material.  *DOI: 10.17217/2079-0333-2018-43-55-59*  **Information about the authors**  **Eremeeva Natalia Borisovna –** Samara State Technical University; 443100, Russia, Samara; Technology and Organization of Public Catering Chair, Postgraduate; rmvnatasha@rambler.ru  **Makarova Nadezhda Viktorovna –** Samara State Technical University; 443100, Russia, Samara; Doctor of Chemical Sciences, Professor, Head of Technology and Organization of Public Catering Chair; makarovanv1969@yandex.ru |
| УДК: [598.243.8+591.543.43:597.552.511](282.257.25)  **E.G. Lobkov**  **TROPHIC MOVEMENTS OF GULLS AND TERNS ON THE LOWER REACH  OF THE AVACHA RIVER (SOUTH-EASTERN KAMCHATKA) AND THEIR CONNECTION WITH RIVER MIGRATION AND SPAWNING OF THE PACIFIC SALMONS**  In 2015 trophic movements of Gulls and Trerns in the lower reach of the Avacha River are studied. Movements of birds last about half a year, but their greatest intensity falls on the period of mass river migration and spawning of the Pacific salmons. The nature of movements of different species of Gulls and Terns differs and corresponds to their trophic strategy. In a day in the lower reach of the Avacha along the river about 7 thousand individuals of birds can fly by. The morning wave of trophic movements is bound to flight of gulls to places of feeding upstream of the river, in the evening they in large quantities come back downstream to places of nesting in the delta of the river and in the Avacha Bay. The Slaty-backed Gulll differs in the largest number.  **Key words**: Kamchatka, larids, Gulls, Terns, trophic movements, Avacha river, Slaty-backed Gull, Black-headed Gull, Mew Gull, Common Tern.  *DOI: 10.17217/2079-0333-2018-43-60-73*  **Information about the author**  **Lobkov Evgeniy Georgievich** – Kamchatka State Technical University; 683003, Russia, Petropavlovsk-Kamchatskу; Doctor of Biological Sciences, Professor of Water Bioresources, Fishery and Aquaculture Chair |
| УДК 582.272.462 (265.5)  **A.V. Klimova, T.A. Klochkova, N.G. Klochkova**  **Infraspecies FORMS OF *ALARIA ESCULENTA* (LAMINARIALES, OCHROPHYTA) IN the marine FLORA OF EASTern KAMCHATKA: FIRST REVISION**  Until recently, it was believed that *Alaria angusta* and *A. marginata* are distributed on the coast of eastern Kamchatka based on the revision of the Far Eastern laminariaceaen algae by Yu.E. Petrov. Despite obvious morphological differences between these species from Kamchatka, our molecular-phylogenetic analysis based on the chloroplast Rubisco, nuclear rDNA and mitochondrial cytochrome oxidase subunit 1 (COI) genes showed  99,8–100% identity between them; also, they are genetically identical to *A. esculenta*. Our new sequences of *Alaria* from Kamchatka were registered in the NCBI under the following accession numbers: MG993131–MG993134, MG993136–MG993137. Species *A. esculenta* was first recorded from the eastern Kamchatka in 1840 by A. Postels and F.I. Ruprecht, who described its three «differences»: α *angustifolia*, β *latifolia* and γ *pinnatifida*. We performed comparative analysis of their descriptions and studied morphology of specimens collected during expedition held by M.N. Stanyukovich and F.P. Litke, which are currently stored in the herbarium of Komarov's Botanical Institute (LE). From our observations, we concluded the following: *A. angusta* and *A. marginata* were erroneously reported for the algal flora of eastern Kamchatka. In fact, these misidentified taxa belong to a widespread polymorphic species *A. esculenta*, which is represented by two stable forms on the coast of eastern Kamchatka. Thus, we proposed new nomenclatural combinations to raise the «differences» α *angustifolia* and  β *latifolia* to the rank of species forms. They correspond to the descriptions of *A. angusta* and *A. marginata*, respectively, provided by Yu.E. Petrov. The third «difference» *A. esculenta* γ *pinnatifida* was recognized as nomen illegitimum and synonymised with *A. esculenta*.  **Key words:** Alariaceae, *Alaria esculenta* f. *angustifolia*, *A. esculenta* f. *latifolia*, *A. esculenta* f. *pinnatifida*, type specimen, type locality, Avacha Bay, Kamchatka, Northern Pacific area.  *DOI: 10.17217/2079-0333-2018-43-74-86*  **Information about the authors**  **Klimova Anna Valerevna –** Kamchatka State Technical University; Petropavlovsk-Kamchatskу, Russia, 683003; Researcher of Science and Innovation Department; annaklimovae@mail.ru  **Klochkova Tatyana Andreevna** – Kamchatka State Technical University; 683003, Russia, Petropavlovsk-Kamchatskу; Doctor of Biological Sciences; Doctor of Philosophy in Biology (Ph.D.), Associate Professor of Ecology and Nature Management Chair; tatyana\_algae@mail.ru  **Klochkova Nina Grigorevna** – Kamchatka State Technical University; 683003, Russia, Petropavlovsk-Kamchatskу; Doctor of Biological Sciences; Director of Centre for Scientific Education, Research and Innovation Projects; ninakl@mail.ru |
| УДК 582.272  **T.A. Klochkova, N.G. Klochkova**  **problems of genesystematics AND CHANGE OF THE GENeric name**  **and AUTHORITY in the kelp species**  ***Saccharina bongardiana* and *Saccharina* *gurjanovae***  Genesystematics (or molecular systematics) is a supplement to the classical phenotypic taxonomy, which is based on morphological and anatomical taxonomic characters and reflects differences between species at the level of cellular structure, physiology, biochemical organization, ecology, developmental biology and other characters. Genesystematics does not replace phenotypic taxonomy and in some cases makes it more chaotic, instead of bringing the expected order, since it erases morphological differences between genera and families, as for example in the kelp species. The international scientific community is urged to present sequencing data in the electronic database «National Center for Biotechnology Information» (NCBI) as nucleotide/amino acid sequences. Although this requirement is absent in the International Code of Botanical Nomenclature, its implementation is necessary for publishing results of molecular systematic studies in the open press, because sequences are to confirm the validity of nomenclatural changes proposed on the basis of their comparative analysis. Failure to submit sequences to the NCBI and, consequently, non-compliance to generally accepted norms of molecular systematics makes such nomenclatural changes invalid. In phycology, such case occurred when transferring species from the genus *Laminaria* (*L. bongardiana* Postels et Ruprecht and *L. gurjanovae* Zinova) to the genus *Saccharina* by Selivanova et al. (2007). Thus, we propose the following: 1) the nomenclatural combinations proposed in the above cited work should be considered invalid; 2) the following authority of *Saccharina bongardiana* should be considered valid: *S. bongardiana* (Postels et Ruprecht) McDevit et Saunders, because D.C. McDevit and G.W. Saunders were the first authors who registered sequences of this species in the NCBI; 3) it should be considered unacceptable to change generic names of species based of the results of sequencing of samples that do not belong to the type form of species in question; 4) it should be considered unacceptable to change names of taxa based on sequencing of specimens, which were collected far from the type locality of species in question, as was done in the work by Selivanova et al. (2007) regarding *L. gurjanovae*.  **Key words:** genesystematics, phenotypic systemtics, order Laminariales, *Laminaria bongardiana*, *Laminaria gurjanovae*, *Saccharina bongardiana*, *Saccharina gurjanovae*, type locality, molecular phylogeny.  *DOI: 10.17217/2079-0333-2018-43-87-95*  **Information about the authors**  **Klochkova Tatyana Andreevna –** Kamchatka State Technical University; Russia, 683003, Petropavlovsk-Kamchatskу; Doctor of Biological Sciences, Doctor of Philosophy in Biology (Ph.D.), Associate Professor of Chair of Ecology and Nature Management; tatyana\_algae@mail.ru  **Klochkova Nina Grigorevna** – Kamchatka State Technical University; 683003, Russia, Petropavlovsk-Kamchatskу; Doctor of Biological Sciences; Director of Centre for Scientific Education, Research and Innovation Projects; ninakl@mail.ru |
| УДК 336.748.5"1947"(47+57)  **V.А. Petrenko**  **ON NECESSITY AND RESULTS OF THE CURRENCY REFORM IN 1947**  **IN THE SOVIET UNION**  The article reveals the reasons of the currency reform in the Soviet Union in the postwar years. The rationale for it is analyzed. The content, the main directions and stages of implementation of the reform are considered. In the economic literature there are many conflicting opinions on the outcome of the currency reform of 1947, so the need arises for a detailed study of the reform results in order to objectively formulate its importance for the future development of the economic system of the country.  **Key words:** currency reform, cash, introduction, income, post-war economic situation.  *DOI: 10.17217/2079-0333-2018-43-96-100*  **Information about the author**  **Petrenko Viktor Andreevich** – Fiscal Policy Department of Elizovo Municipal District Administration; Russia, Elizovo, 68400; Candidate of Economic Sciences; Head of Fiscal Policy Department; petrenkovikan@rambler.ru |
| УДК 332.1  **G.A. Shavkun**  **PECULIARITIES OF DEVELOPMENT OF REGIONAL SOCIO-ECONOMIC SYSTEMS UNDER CONDITIONS OF UNSTABLE ENVIRONMENT**  Key terms of the sustainability of regional socio-economic system were identified in the article. Functioning peculiarities of the individual Ukraine’s regions (Donetsk, Dnepropetrovsk and Lviv oblasts) taking into account their territorial features were studied. Proceeding from the groups of factors reflecting regional economic, social and ecological development, the relevant indicators on the groups were highlighted in the work and sustainability of the given oblasts’ development was assessed from the perspective of the regional system ability to use resources available without disequilibrium efficiently.  **Key words:** sustainability, development, region, socio-economic system, sustainability indicator, external environment.  *DOI: 10.17217/2079-0333-2018-43-101-108*  **Information about the author**  **Shavkun Galina Afanasevna** – Donetsk National Technical University; 83001, Ukraine, Donetsk; Candidate of Economic Sciences; Associate Professor of International Economy Chair; Galina.Shavkun@mail.ru |
| УДК 574.5  **E.E. Shirkova, E.I. Shirkov, V.A. Masnev**  **ARCTIC AND SUB-ARCTIC SEAS OF RUSSIA AS A LARGE RESERVOIR OF STOCK, DEPOSITION AND BURIAL OF ATMOSPHERIC CARBON**  The paper presents the approximate physical and cost estimates of the carbon capacity of ecosystems of Russian subarctic seas on the example of dissolved organic matter (DOM) of the Okhotsk Sea. Dissolved organic matter is the main reservoir of long-term deposition (hundreds of years) and indefinite burial of significant volume of atmospheric carbon in the arctic and subarctic seas of Russia.  The carbon capacity of the DOM of the Okhotsk Sea is estimated by the authors about 2 gigatons of organic carbon, or up to 7 gigatons of carbon dioxide. These assessments have been carried out for the first time and exceed the relevant totals of all the Arctic seas of our country.  In international climate relations, Russia needs to clarify and take into account the total carbon capacity of ecosystems and water masses of its Arctic and subarctic seas more fully. This could end the protracted debate over whether our country is a net emitter of carbon dioxide, or one of the major donors to the world economy in the long-term deposition of anthropogenic atmospheric carbon.  **Key words**: climate problems, ecosystems of arctic and subarctic seas, Okhotsk Sea, dissolved organic matter, deposition and fossilization of carbon.  *DOI: 10.17217/2079-0333-2018-43-109-118*  **Information about the authors**  **Shirkova Elena Eduardovna** – Kamchatka Branch of Pacific Geographical institute FEB RAS; 683000, Russia, Petropavlovsk-Kamchatskу; Candidate of Economic Sciences, Deputy Director for Science; kftigkamchatka@mail.ru  **Shirkov Eduard Ivanovich** – Kamchatka Branch of Pacific Geographical institute FEB RAS; 683000, Russia, Petropavlovsk-Kamchatskу; Candidate of Economic Sciences, Head of Ecological and Economic Research Laboratory; kftigkamchatka@mail.ru  **Macnev Vitaliy Anatolievich** – Kamchatka Branch of Pacific Geographical institute FEB RAS; 683000, Russia, Petropavlovsk-Kamchatskу; Engineer of Ecological and Economic Research Laboratory; kftigkamchatka@mail.ru |