

AL-FARABI KAZAKH
NATIONAL UNIVERSITY



INFORMATION
about publication activity
FACULTY OF MECHANICS AND MATHEMATICS

№	Наименование публикации	Выходные данные (doi статьи)	Аннотация статьи	Ссылка для цитирования (Ф.И.О., название статьи, название, номер и/или выпуск, том журнала, страницы, doi статьи)
1.	Numerical simulation on solar collector and cascade heat pump combi water heating systems in Kazakhstan climates	DOI: https://doi.org/10.1016/j.renene.2019.06.102 (SJR 0,83;Q1, Procentile 88 (Renewable Energy, Sustainability and the Environment)).	At low ambient temperatures, the heating capacity and <u>coefficient of performance</u> of a single stage <u>vapour compression</u> heat pump cycle is significantly getting reduced. The two stage cascade heat pump cycle operating with two different <u>refrigerants</u> provides a sustainable solution to lift the <u>condenser temperature</u> above 343 K. In this work, a numerical simulation model was developed for predicting the performance of a solar collector and two stage cascade heat pump combi water heating systems under Kazakhstan <u>climatic conditions</u> . The numerical simulation was performed for winter climatic conditions using nine refrigerant pairs such as, R32/R290,	Yerdesh, Y., Abdulina, Z., Aliuly, A., Mohanraj, M., Kaltayev, A, Numerical simulation on solar collector and cascade heat pump combi water heating systems in Kazakhstan climates. // <i>Renewable Energy</i> . – 2020. – Vol.145. – P.1222-1234 DOI: https://doi.org/10.1016/j.renene.2019.06.102

			<p>R32/R1234yf, R32/R134a, R410A/R290, R410A/R1234yf, R410A/R134a, R744/R290, R744/R1234yf and R744/R134a. The influences of <u>solar irradiation</u>, ambient temperature and condenser temperature are discussed. The solar collector and two stage heat pump combi heating system has about 30% energy savings when compared to the conventional two stage cascade heat pump without integration solar collectors. The R32/R290 refrigerant pair is having maximum coefficient of performance of 2.4 at 323 K condensing temperature and 263 K evaporating temperature. The refrigerant R744/R290 pair is identified as an environment friendly sustainable option in terms of its global warming impact for two stage cascade heat pump applications.</p>	
2.	<p>A Study of Secular Perturbations of Translational-Rotational Motion in a Nonstationary Two-Body Problem Using Computer Algebra</p>	<p>DOI: 10.1134/S0965542520010054 (SJR 0,53;Q2, Procentile 35(Mathematics - Computational Mathematics)).</p>	<p>A nonstationary two-body problem is considered such that one of the bodies has a spherically symmetric density distribution and is central, while the other one is a satellite with axisymmetric dynamical structure, shape, and variable oblateness. Newton's interaction force is characterized by an approximate expression of the force function up to the second harmonic. The body masses vary isotropically at different rates. Equations of motion of the satellite in a relative system of coordinates are derived. The problem is studied by the methods of perturbation theory. Equations of secular perturbations of the translational-rotational motion of the satellite in analogues of Delaunay-Andoyer osculating elements are deduced. All necessary symbolic computations are performed using the Wolfram Mathematica</p>	<p>Bizhanova, S.B., Minglibayev, M.Z., Prokopenya, A.N., A Study of Secular Perturbations of Translational-Rotational Motion in a Nonstationary Two-Body Problem Using Computer Algebra. // <i>Mechanisms and Machine Science Computational Mathematics and Mathematical Physics</i>,. – 2020. – Vol.60. – P.26-35 DOI: 10.1134/S0965542520010054</p>

			computer algebra system. © 2020, Pleiades Publishing, Ltd.	
3.	Numerical calculation of the pressure drop and saturation of two-phase flow through porous medium	DOI: https://doi.org/10.2118/202570-MS (SJR 0, Procentile -).	Two-phase flow through a fibrous porous medium is numerically simulated. The goal of the study is to investigate the effect of numerical slip length on variation of pressure drop and saturation. The simulation is based on the numerical solution of incompressible Navier-Stokes equations for two-phase flow around a circular cylinder with radii in the ranges from 0.1 to 0.4. Variations of pressure drop and saturation in time are numerically calculated on simple and snap meshes for different values of surface tension (σ), viscosity ratio ($M = \mu_{nw}/\mu_w$), and mesh sizes. Also, numerical results using simple and snap meshes are compared. Numerical calculations are performed using the interFoam solver in OpenFOAM® finite volume library. The presented results show that solutions of saturation and pressure drop in time vary with mesh refinement, so the numerical slip length significantly affects the flow. For a coarser mesh the influence of numerical slip length is less than for a finer mesh, also as bigger the value of the viscosity ratio or surface tension as lower the influence of numerical slip length. The results show that the contact line motion significantly depends not only on the microstructure of the porous media, but also on the fluid properties (viscosity ratio, surface tension and etc.). Copyright 2020, Society of Petroleum Engineers.	Akashева, Z., Assilbekov, B., Kudaikulov, A., Bolysbek, D., Numerical calculation of the pressure drop and saturation of two-phase flow through porous medium. //Society of Petroleum Engineers - SPE Annual Caspian Technical Conference 2020, CTC 2020. – 2020. SPE Annual Caspian Technical Conference 2020, CTC 2020 DOI: https://doi.org/10.2118/202570-MS
4.	Experimental and Theoretical Studies of the Efficiency of Autonomous Multistory Wind Power Plants	DOI: 10.1134/S1063784220010168 (SJR 0,3;Q3, Procentile 23(Engineering Mechanical Engineering) 18(Engineering	The compact multistory wind power plants developed by authors for the first time in the world have been studied. Their efficiency due to the autonomy, compactness, and use of draft effect, which occurs between stories, has been shown. Thanks to this, compact multistory	Kunakbaev, T., Tanasheva, N.K., Dyusembaeva, A.N., Shaimerdenova, K.M., Sagitzhanov, B.M., Experimental and Theoretical Studies of the Efficiency of Autonomous Multistory Wind Power Plants.

		Mechanics of Materials)23(Physics and Astronomy - Physics and Astronomy (miscellaneous)).	wind power plants will have some advantages in comparison with conventional wind power plants and separated wind-driven generators with the same power. © 2020, Pleiades Publishing, Ltd.	//Technical Physics. – 2020. – Vol.65. – P.37-40 DOI: 10.1134/S1063784220010168
5.	Automated determination of internal points of the coordinate grid of the blasted rock mass	DOI: 10.1051/e3sconf/202016800015 (SJR 0,2; Procentile 25(Energy General Energy) 20(Environmental Science General Environmental Science) 19(Earth and Planetary Sciences General Earth and Planetary Sciences)).	An automated method for determining the internal points of the coordinate grid of the blasted rock mass is described. It is based on the method of determining the nodal points of the coordinate grid of the blasted rock mass, which is based on taking into account the dependencies that connect the initial parameters of the blasting rock mass with the final location of the fixed points of the blasted rock mass. The determining factors are the specific height and width of the collapse, the coefficient of loosening of the rocks. The method of analysis of experimental and industrial mass explosions in quarries, methods of analytical geometry, matrix theory and linear algebra are used. For the first time in mining, an analytical method has been developed for determining the internal points of the coordinate grid of an exploded block. It includes the established functions of the movement of nodal points, components of the vectors of movement of nodal and internal points of the coordinate grid. The established dependencies allow one to determine the displacements of any point inside the coordinate grid of the blasted block from the initial coordinates of the nodal and internal points. © The Authors, published by EDP Sciences, 2020.	Rakishev, B., Rakisheva, Z., Auezova, A., Orynbay,, Automated determination of internal points of the coordinate grid of the blasted rock mass. //E3S Web of Conferences DOI: 10.1051/e3sconf/202016800015
6.	Digital hierarchical model of lumpiness of blasted rock mass	DOI: 10.1080/25726668.2020.1838775 (SJR 0,56;Q2, Procentile 54(Earth and Planetary Sciences Geology) 48(Earth and Planetary Sciences	The article describes the developed new digital hierarchical model of lumpiness of blasted rocks. It is based on a combination of classes of pieces of rock by size, taken as hierarchical levels of lumpiness of rocks, and the percentage	Rakishev, B., Rakisheva, Z.B., Auezova, A.M., Orynbay, A.A., Digital hierarchical model of lumpiness of blasted rock mass. //Mining Technology: Transactions of

		<p>Geotechnical Engineering and Engineering Geology).</p>	<p>of pieces in classes, adopted for its numerical characteristics. 7 classes of rocks by size are considered, each of which is characterized by the content of its pieces. The key component of the proposed model - the granulometric composition of the blasted rocks is determined by the block mass of the rocks, the size of the zones of intense crushing, the volume of crushed rocks due to the action of stress waves and reflected waves (I stage of explosion), detonation products (swelling effect of the explosion) (II stage of explosion), and collisions of large pieces when moving (III stage of explosion). The regularities of the formation of these explosion results are established depending on the different combination of the physicomechanical properties of the rocks of the massif, the chemophysical characteristics of the explosive used, the parameters of the explosives and the explosive method. © 2020 Institute of Materials, Minerals and Mining and The AusIMM Published by Taylor & Francis on behalf of the Institute and The AusIMM.</p>	<p>the Institute of Mining and Metallurgy. – 2020. – Vol.128(4).-P.228-237 DOI: 10.1080/25726668.2020.1838775</p>
7.	<p>The Effect of Applied Pressure Function on Thermo-elastic Problem in the Dry Friction Clutches</p>	<p>DOI: 10.1007/s11668-020-01031-4 (SJR 0,25;Q3, Procentile 36(Engineering Safety, Risk, Reliability and Quality) 34(Engineering Mechanical Engineering) 29(Materials Science General Materials Science) 29(Engineering Mechanics of Materials)).</p>	<p>The main purpose of this paper is to investigate deeply the effect the contact pressure function on the thermo-mechanical behavior of the friction clutch system during the slipping time (heating stage). The other purpose is to explore theoretically the complex interaction among the contact pressure, sliding speed and frictional characteristics of frictional facings to specify the magnitude and distribution of the frictional heating generation on the contact surfaces of the dry friction clutch under different applied pressure. It was developed a numerical code based on finite element method (ANSYS/APDL 2019) to determine accurately the contact pressure, temperature</p>	<p>Stojanovic, N., Abdullah, O.I., Rakisheva, Z.B., Lattieff, F.A., Hashim, E.T., The Effect of Applied Pressure Function on Thermo-elastic Problem in the Dry Friction Clutches. //Journal of Failure Analysis and Prevention. – 2020. – Vol.20(6). – P.2145-2152 DOI: 10.1007/s11668-020-01031-4</p>

			and frictional heat generated on contact surfaces of the friction clutch disc that has two effective frictional faces at any instant during the slipping period. It was found a significant effect of the magnitude and variation of applied pressure during the heating phase on the surface temperatures, contact pressure and frictional heat generated. Where, the hot spot can be appeared when the applied pressure is constant. Under such circumstances, high amount of temperature and contact pressure focused on a small zone of the nominal contact area. This phenomenon is considered one of the main reasons for the early failure of the contacting surfaces of friction clutch. © 2020, ASM International.	
8.	Experimental and Theoretical Studies of the Efficiency of Autonomous Multistory Wind Power Plants	DOI: 10.1134/S1063784220010168 (SJR 0,3;Q3, Procentile 23(Physics and Astronomy -Physics and Astronomy (miscellaneous))).	The compact multistory wind power plants developed by authors for the first time in the world have been studied. Their efficiency due to the autonomy, compactness, and use of draft effect, which occurs between stories, has been shown. Thanks to this, compact multistory wind power plants will have some advantages in comparison with conventional wind power plants and separated wind-driven generators with the same power. © 2020, Pleiades Publishing, Ltd.	Kunakbaev, T., Tanasheva, N.K., Dyusembaeva, A.N., Shaimerdenova, K.M., Sagitzhanov, B.M., Experimental and Theoretical Studies of the Efficiency of Autonomous Multistory Wind Power Plants. //Technical Physics. – 2020. – Vol.65. – P.37-40 DOI: 10.1134/S1063784220010168
9.	Synthesis of four-bar linkage with adjustable crank length for multi-path generation	DOI:10.18178/ijmerr.9.4.489-495 (SJR 0,19;Q4, Procentile 26(Engineering Mechanical Engineering) 22(Engineering Control and Systems Engineering) 14(Computer Science Artificial Intelligence)).	Synthesis of planar mechanism with adjustable crank length for generating multiple paths is presented. Least-square approximation problem is considered which allows carrying out approximate synthesis with unlimited number of desired coupler point positions and with unlimited number of prescribed trajectories. By reducing the task to synthesis of two-element link with variable binary link length, which is called RPR-module, the analytical solution is obtained to determine not only constant design parameters (mechanism	lbrayev S., Jomartov A., Tuleshov A., Jamalov N., lbrayev A., Mukhambetkalieva G., Aidasheva G., Kamal A., Synthesis of four-bar linkage with adjustable crank length for multi-path generation. //International Journal of Mechanical Engineering and Robotics Research. – 2020. – Vol.9(4). – P.489-495 DOI: 10.18178/ijmerr.9.4.489-495

			link lengths) but the adjusting parameter values as well. Thus the number of design variables for non-linear optimization (applied to find the remaining parameters) will be decreased significantly. The applied method is exemplified by synthesis of the mechanism for variable straight line generation, where the required height of the end-effector is adjusted by adjusting the crank length. Combined with random search technique the method allows to find all local minimums of the optimized goal function and thus allows to take full advantage from the considered mechanism structure during design. © 2020 by the authors.	
10.	Designing of the stephenson ii six-link linkage actuator for servo mechanical press	DOI: 10.24247/ijmperdapr202053 (SJR 0; Procentile 22(Engineering Mechanical Engineering) 22(Engineering Aerospace Engineering) 17(Cheical Engineerin Fluid Flow and Transfer Processes)).	Currently, servo mechanical presses with an actuator based on a slider-crank mechanism are widely used for stamping details. One of the major problems of these servo mechanical presses is inclination of slide caused by eccentric application of deforming force and total linear elastic deformation of the press links and stamps under load. The inclination of the slide of the servo mechanical press reduces the accuracy of punching and causes its jamming and lead to its breakage. To eliminate these problems, it is proposed to use Stephenson II six-bar linkage as an actuator of servo mechanical press. The scheme structure of the actuator of servo mechanical press with two connecting rods and one crank based on the Stephenson II six-bar linkage is obtained. Synthesis of the Stephenson II six-bar linkage was carried out. As a result of synthesis, a new actuator of servo mechanical press on the base of the Stephenson II six-bar linkage was obtained and its prototype was made. The prototype of the new actuator of servo mechanical press based on the Stephenson II six-bar linkage was tested. Testing of the	Jomartov, A., Tuleshov, A., Jamalov, N., Kumatova, K., Kaimov, A., Designing of the stephenson ii six-link linkage actuator for servo mechanical press. //International Journal of Mechanical and Production Engineering Research and Development. – 2020. – Vol.10(2). – P.501-512 DOI: 10.24247/ijmperdapr202053

			prototype of the new actuator of servo mechanical press showed a good distribution of the efforts applied during the presswork and a better tolerance of the eccentric load. © TJPRC Pvt. Ltd.	
11.	Optimal synthesis of planar linkages	DOI: 10.32014/2020.2518-170X.21 (SJR 0,32;Q3, Procentile 23(Engineering Mechanical Engineering) 18(Engineering Mechanics of Materials)40(Earth and Planetary Sciences Geology) 37(Earth and Planetary Sciences Geotechnical Engineering and Engineering Geology)).	This paper investigates the optimal synthesis of planar linkages. The main idea of this paper is to find the initial approximations based on the use of Burmester points for function generator linkages, path generator linkages, motion generator linkages. The results of the numerical synthesis of the linkages depend on the choice of the initial approximations. A more flexible method to the search for initial approximations is the method based on the use of Burmester points. This method allows the determination of the initial approximations analytically for three, four or five by established initial data of synthesis. In this case, the problem is reduced to determining the solutions of polynomials, respectively the second, third and fourth degree. The method consists in that the synthesized linkage is conditionally divided into initial kinematic chains and closing kinematic chains, and Burmester points are determined for each chain. After the choice of initial approximations, an objective function is formed according to the output criteria, depending on the synthesis parameters, using the Chebyshevsky (best) or quadratic approximation problems. The synthesis parameters of planar linkages are determined from objective function minimum. According to this method, a program for the synthesis of planar linkages has been developed. An example is included to demonstrate the method. © 2020, National Academy of	Tuleshov, A.K., Jomartov, A.A., Ibrayev, S., Jamalov, N.K., Halicioglu, R., A gripper mechanism to automate overload process for fuel elements. //News of the National Academy of Sciences of the Republic of Kazakhstan, Series of Geology and Technical Sciences. – 2020. – Vol.1(439). – P.172-180 DOI: 10.32014/2020.2518-170X.21

			Sciences of the Republic of Kazakhstan. All rights reserved.	
12.	Synthesis of four-bar linkage with adjustable crank length for multi-path generation	DOI: 10.18178/ijmerr.9.4.489-495 (SJR 0,19;Q4, Procentile 26(Engineering Mechanical Engineering) 22(Engineering Control and Systems Engineering) 14(Computer Science Artificial Intelligence)).	Synthesis of planar mechanism with adjustable crank length for generating multiple paths is presented. Least-square approximation problem is considered which allows carrying out approximate synthesis with unlimited number of desired coupler point positions and with unlimited number of prescribed trajectories. By reducing the task to synthesis of two-element link with variable binary link length, which is called RPR-module, the analytical solution is obtained to determine not only constant design parameters (mechanism link lengths) but the adjusting parameter values as well. Thus the number of design variables for non-linear optimization (applied to find the remaining parameters) will be decreased significantly. The applied method is exemplified by synthesis of the mechanism for variable straight line generation, where the required height of the end-effector is adjusted by adjusting the crank length. Combined with random search technique the method allows to find all local minimums of the optimized goal function and thus allows to take full advantage from the considered mechanism structure during design. © 2020 by the authors.	Ibrayev S.,Jomartov A.,Tuleshov A.,Jamalov N.,Ibrayev A.,Mukhambetkalieva G.,Aidasheva G.,Kamal A.,Synthesis of four-bar linkage with adjustable crank length for multi-path generation. //International Journal of Mechanical Engineering and Robotics Research. – 2020. – Vol.9(4). – P.489-495 DOI: 10.18178/ijmerr.9.4.489-495
13.	GNSS-Based Attitude Determination Techniques-A Comprehensive Literature Survey	DOI: 10.1109/ACCESS.2020.2970083 (SJR 0,59;Q1, Procentile 87(Engineering General Engineering) 81(Computer Science General Computer Science) 70(Materials Science General Materials Science)).	GNSS-based Attitude Determination (AD) of a mobile object using the readings of the Global Navigation Satellite Systems (GNSS) is an active area of research. Numerous attitude determination methods have been developed lately by making use of various sensors. However, the last two decades have witnessed an accelerated growth in research related to GNSS-based navigational equipment as a reliable and competitive device for determining the attitude of any outdoor	Raskaliyev, A., Patel, S.H., Sobh, T.M., Ibrayev, A., GNSS-Based Attitude Determination Techniques-A Comprehensive Literature Survey. //IEEE Access. – 2020. – Vol.8. – P.24873–24886, 8972427 DOI: 10.1109/ACCESS.2020.2970083

			<p>moving object using data demodulated from GNSS signals. Because of constantly increasing number of GNSS-based AD methods, algorithms, and techniques, introduced in scientific papers worldwide, the problem of choosing an appropriate approach, that is optimal for the given application, operational environment, and limited financial funding becomes quite a challenging task. The work presents an extensive literature survey of the methods mentioned above which are classified in many different categories. The main aim of this survey is to help researchers and developers in the field of GNSS applications to understand pros and cons of the current state of the art methods and their computational efficiency, the scope of use and accuracy of the angular determination. © 2020 IEEE.</p>	
14.	Some approaches to assessing the quality of masking noise interference of spatial noise generators	DOI: (SJR 0,15;Q4, Procentile 36(Computer Science General Computer Science) 16(Mathematics Theoretical Computer Science)).	<p>The article discusses the characteristics of spatial electromagnetic noise generators and the formation of a broadband noise signal. It also describes a number of known methods and methods for assessing the quality of masking noise interference and their differences. Different approaches to measuring masking noise when evaluating its quality are proposed. The first method is based on the measurement of the instantaneous values of the amplitudes of the noise signal and the calculation of the entropy coefficient based on this method. The second method involves searching for correlation of masking noise signals of noise generators in different frequency subbands. The third approach is to use statistical and (or) graphical methods (tests) for randomness. The completeness and objectivity of assessing the quality of masking noise interference from spatial noise generators will be achieved by</p>	<p>Smailov, N., Batyrgaliyev, A., Seilova, N., Kuttybaeva, A., Ibrayev, A., Some approaches to assessing the quality of masking noise interference of spatial noise generators. // <i>Journal of Theoretical and Applied Information Technology</i>. – 2020. – Vol.98. – P.3555-3574 DOI:</p>

			combining all the methods. © 2005 – ongoing JATIT & LLS.	
15.	GPU Accelerated Modeling of In-Situ Leaching Process and Streamline Based Reactive Transport Simulation	DOI: 10.1016/j.procs.2020.11.016 (SJR 0,33; Procentile 68(Computer Science General Computer Science)).	In present paper GPU acceleration modeling and Streamline based reactive transport simulation for uranium In-Situ leaching process is studied. In-Situ leaching (ISL) is a method of selective dissolution of mineral inside of rock by injection of leaching solution to the layer through the wells and chemical interaction of leaching solution with ore. Changing of flow rates on wells over time leads to increasing computational time and simulation of In-Situ leaching problem becomes resource-intensive problem. Acceleration of the hydrodynamic of the ISL process is carried out on GPU; parallelization of reactive mass transport due to reaction of leaching solute with mineral is performed by with multi-Threading and streamlines simulation. © 2020 Elsevier B.V.. All rights reserved.	Tungatarova, M.S., Kurmanseit, M.B., Shayakhmetov, N.M., GPU Accelerated Modeling of In-Situ Leaching Process and Streamline Based Reactive Transport Simulation. //Procedia Computer Science. – 2020. – Vol.178. – P.145-152 DOI: 10.1016/j.procs.2020.11.016
16.	Synthesis of four-bar linkage with adjustable crank length for multi-path generation	DOI: 10.18178/ijmerr.9.4.489-495 (SJR 0,19;Q4, Procentile 26(Engineering Mechanical Engineering) 22(Engineering Control and Systems Engineering) 14(Computer Science Artificial Intelligence)).	Synthesis of planar mechanism with adjustable crank length for generating multiple paths is presented. Least-square approximation problem is considered which allows carrying out approximate synthesis with unlimited number of desired coupler point positions and with unlimited number of prescribed trajectories. By reducing the task to synthesis of two-element link with variable binary link length, which is called RPR-module, the analytical solution is obtained to determine not only constant design parameters (mechanism link lengths) but the adjusting parameter values as well. Thus the number of design variables for non-linear optimization (applied to find the remaining parameters) will be decreased significantly. The applied method is exemplified by synthesis of the mechanism for	lbrayev S.,Jomartov A.,Tuleshov A.,Jamalov N.,lbrayev A.,Mukhambetkalieva G.,Aidasheva G.,Kamal A.,Synthesis of four-bar linkage with adjustable crank length for multi-path generation. //International Journal of Mechanical Engineering and Robotics Research. – 2020. – Vol.9(4). – P.489-495 DOI: 10.18178/ijmerr.9.4.489-495

			variable straight line generation, where the required height of the end-effector is adjusted by adjusting the crank length. Combined with random search technique the method allows to find all local minimums of the optimized goal function and thus allows to take full advantage from the considered mechanism structure during design. © 2020 by the authors.	
17.	Designing of the stephenson ii six-link linkage actuator for servo mechanical press	DOI: 10.24247/ijmperdapr202053 (SJR 0; Procentile 22(Engineering Mechanical Engineering) 22(Engineering Aerospace Engineering) 17(Cheical Engineering Fluid Flow and Transfer Processes)).	Currently, servo mechanical presses with an actuator based on a slider-crank mechanism are widely used for stamping details. One of the major problems of these servo mechanical presses is inclination of slide caused by eccentric application of deforming force and total linear elastic deformation of the press links and stamps under load. The inclination of the slide of the servo mechanical press reduces the accuracy of punching and causes its jamming and lead to its breakage. To eliminate these problems, it is proposed to use Stephenson II six-bar linkage as an actuator of servo mechanical press. The scheme structure of the actuator of servo mechanical press with two connecting rods and one crank based on the Stephenson II six-bar linkage is obtained. Synthesis of the Stephenson II six-bar linkage was carried out. As a result of synthesis, a new actuator of servo mechanical press on the base of the Stephenson II six-bar linkage was obtained and its prototype was made. The prototype of the new actuator of servo mechanical press based on the Stephenson II six-bar linkage was tested. Testing of the prototype of the new actuator of servo mechanical press showed a good distribution of the efforts applied during the presswork and a better tolerance of the eccentric load. © TJPRC Pvt. Ltd.	Jomartov, A., Tuleshov, A., Jamalov, N., Kumatova, K., Kaimov, A., Designing of the stephenson ii six-link linkage actuator for servo mechanical press. //International Journal of Mechanical and Production Engineering Research and Development. – 2020. – Vol.10(2). – P.501-512 DOI: 10.24247/ijmperdapr202053

18.	Dynamic Model of a Crank Press in the Process of Braking	DOI: 10.1007/978-3-030-30036-4_12 (SJR 0,16;Q4, Procentile 23(Engineering Mechanical Engineering) 18(Engineering Mechanics of Materials)).	The paper studies the dynamic of a brake of crank press. At present, the dynamic research of brake of the crank presses, with account of interaction with other links, is a priority. The crank press contains movable parts and links, the mass of which is from one hundred kilograms to several tons. These parts and links are cyclically stopped when braking with a crank press almost instantaneously, and they are subject to high dynamic loads. To simulate and analyze the movement of crank press with brake, a software package: SimulationX is used. SimulationX is a software package for modeling and analyzing the dynamics and kinematics of cars, industrial equipment, electric, pneumatic and hydraulic drives, hybrid engines, etc. As a result of dynamic calculation, important dynamic parameters of the crank press brake and working ram are determined. It is shown that dynamic loads sharply increase almost in all links of the crank press when the brake is switched on. © 2020, Springer Nature Switzerland AG.	Jomartov, A., Tuleshov, A., Kumatova, M., Dynamic Model of a Crank Press in the Process of Braking. //Mechanisms and Machine Science. – 2020. – Vol.78. – P.141-150 DOI: 10.1007/978-3-030-30036-4_12
19.	Structurally parametric synthesis and position analysis of a robomech class parallel manipulator with two end-effectors	DOI: (SJR 0,26;Q3, Procentile 49(Mathematics Applied Mathematics)).	In this paper, the methods of structurally parametric synthesis and position analysis of a RoboMech class parallel manipulator with two end-effectors are presented. This parallel manipulator is formed by connecting the two moving output objects with the fixed base by two passive, one active and two negative closing kinematic chains. Geometrical parameters of the active and negative closing kinematic chains are determined by the Chebyshev and least-square approximations. Position analysis is made on base of the conditional generalized coordinates method. © 2020 International Association of Engineers.	Baigunchekov Z.6Naurushev B., Zhumasheva Z., Mustafa A., Kairov R., Amanov B, Structurally parametric synthesis and position analysis of a robomech class parallel manipulator with two end-effectors. //IAENG International Journal of Applied Mathematics. – 2020. – Vol.5(1-77). – P.1-11 DOI:

20.	The First Type of Singularity of a 3-PRRS Parallel Manipulator	DOI: 10.1007/978-3-030-48989-2_38 (SJR 0,16;Q4, Procentile 23(Engineering Mechanical Engineering) 18(Engineering Mechanics of Materials)).	In this paper, the first type of singularity of a 3-PRRS parallel manipulator is considered. This type of singularity appears when the determinant of the Jacobian matrix of the generalized velocities goes to zero. In this case, the parallel manipulator loses one or more degrees of freedom (DOF). From the analysis of the degeneracy of the generalized velocities Jacobian matrix, the conditions of the first type singular configurations are determined.	Baigunchekov, Z., Laribi, M.A., Izmambetov, M., Zhumasheva, Z., Kaiyrov, R.,The First Type of Singularity of a 3-PRRS Parallel Manipulator. // <i>Mechanisms and Machine Science</i> . – 2020. – Vol.84. – P.356-363 DOI: 10.1007/978-3-030-48989-2_38
21.	Performance analysis of crushed gravel sand heat storage and biomass evaporator-assisted single slope solar still	DOI: 10.1007/s11356-021-15487-w (SJR 0,85;Q2, Procentile 79 (Environmental Science-Pollution) 76(Environmental Science-Health, Toxicology and Mutagenesis) 67(Environmental Science-Environmental Chemistry)).	In this research work, the productivity, energy, exergy, and economic and enviro-economic performance in crushed gravel sand heat storage and biomass evaporator-assisted solar still (CGS-BSS) have been investigated and compared the results with conventional solar still (CSS) under the similar climatic conditions of Coimbatore City during the year 2019. The heat accumulated in crushed gravel sand and biomass evaporator have been used to preheat the inlet saline water and air vapor before entering into the solar still. This results in enhanced air vapor mixture temperature and evaporative heat transfer rate of CGS-BSS significantly. The productivity, energy, and exergy efficiencies in CGS-BSS were improved by 34.6%, 34.4%, and 35%, respectively when compared to CSS. In economic analysis, the payback period (PBP) in both CGS-BSS and CSS was estimated to be about 4.7 months and 3.9 months, respectively. Furthermore, in enviro-economic analysis, the CO2 emission estimated in CGS-BSS and CSS was about 16.63 tons and 8.18 tons, respectively during its lifetime of 10 years.	Ramasamy Dhivagar, Murugesan Mohanraj, Yerzhan Belyayev ,Performance analysis of crushed gravel sand heat storage and biomass evaporator-assisted single slope solar still. // <i>Environmental Science and Pollution Research</i> . – 2021. DOI: 10.1007/s11356-021-15487-w
22.	Walking Robot Leg Design Based on Translatory	DOI: 10.1007/978-3-030-58380-4_32 (SJR 0,21;Q3, Procentile 37(Engineering Mechanical Engineering) 32(Engineering	The planar straight-line generating linkages are of great interest for walking robot propel, especially to reduce power consumption and simplify control. Optimal design of six-link leg	Ibrayev S.,Jamalov N.,Tuleshov A.,Jomartov A.,Ibrayev A.,Kamal A.,Ibrayeva A.,Bissembayev K., Walking Robot Leg Design Based on Translatory

	Straight-Line Generator	Mechanics of Materials) 30(Computer Science Computer Science Applications) 27(Mathematics Modeling and Simulation)).	linkage is proposed with unlimited foot adaptation on terrain irregularities due to rectilinear and translatory motion of the output link, referred to as shin-link. The analytical method of synthesis is proposed based on least-square approximation. Due to minimizing directly the deviation from the desired output motion, the method does not suffer from so called branching defect and allows synthesizing the mechanism with desired transmission angle. Multi-criteria optimization attaining both the best accuracy and transmission angle is carried out and leg-linkage with maximal value of duration ratio of support and transference phases of the leg step cycle is presented. © 2021, CISM International Centre for Mechanical Sciences.	Straight-Line Generator. //CISM International Centre for Mechanical Sciences, Courses and Lectures. – 2021. – Vol.601. – P.264-271 DOI: 10.1007/978-3-030-58380-4_32
23.	Dynamic Model of Servo Mechanical Press	DOI: 10.1007/978-3-030-58380-4_21 (SJR 0,21;Q3, Procentile 37(Engineering Mechanical Engineering) 32(Engineering Mechanics of Materials) 30(Computer Science Computer Science Applications) 27(Mathematics Modeling and Simulation)).	Servo mechanical press is a mechatronic system, consisting of a reducer, actuator and a servomotor with a controller. Control of the servo mechanical press is carried out with a help of the controller depending of technological process of pressing. Reverse kinematic analysis of the actuator of the servo mechanical press is presented in the work to determine the law of motion of a crank, reproducing the specified law of motion of the servo mechanical press slide. Obtained law of motion of the actuator's crank of the servo mechanical press is necessary to choose the servomotor. Considering that servo mechanical press works by complex programmable motion large dynamic loads occur in its nodal points and links. The work proposes to simulate the dynamics of the servo mechanical press on the software complex SimulationX. Dynamic model of the servo mechanical press is composed with account for elastic-dissipative characteristics of the links and the parameters of the servomotor, for different laws of motion of the slide. A dynamic	Jomartov, A., Tuleshov, A., Jamalov, N., Temirbekov, Y., Bostanov, B., Dynamic Model of Servo Mechanical Press. //CISM International Centre for Mechanical Sciences, Courses and Lectures. – 2021. – Vol.601. – P.170-178 DOI: 10.1007/978-3-030-58380-4_21

			<p>model of a 50-ton servo mechanical press is developed using the SimulationX software package. Calculation was carried out using real data of the existing 50 ton servo mechanical press. As a result of the calculation of the dynamic model of the servo mechanical press, the following data were obtained: motion, velocity, acceleration of the slide, torque effect on the crank, angular rate, torque effect, power of the servomotor.</p>	
24.	<p>Unsteady Resonant Oscillations of a Gyroscopic Rigid Rotor with Non-linear Damping and Non-linear Rigidity of the Elastic Support</p>	<p>DOI:10.1007/978-3-030-83594-1_9 (SJR 0,16;Q4, Procentile 23(Engineering Mechanical Engineering) 18(Engineering Mechanics of Materials)).</p>	<p>The article is concerned with the effect of linear and cubic non-linear damping of an elastic bearing on forced resonant vibrations of a gyroscopic vertical rigid rotor taking into account non-linear stiffness of the cubic nature of the bearing material. It is confirmed that non-linear cubic damping of the support can suppress not only the maximum amplitude, but also the amplitudes of forced unsteady oscillations behind the rotation speed corresponding to the maximum amplitude and the variation of its values in time along the main curve, around its mean values. It shifts the speed of rotation of the amplitude maximum, with rigid and soft non-linear elastic characteristics of the support material downwards and upwards, respectively. It is shown that with a “slow” increase in the shaft rotation speed, an increase in the absolute value of the angular acceleration is accompanied by a shift of the amplitude peak towards high speeds, with a “slow” decrease in the shaft rotation speed – towards low speeds with a decrease in the amplitude of oscillations. It is shown that during the rotor takeoff run, the maximum amplitude for the case with a rigid non-linear elasticity characteristic of the support material is greater than the same value for the case with a soft non-linear elasticity characteristic of the support material, and conversely, during the rotor run-down for similar cases.</p>	<p>Iskakov, Z., Jamalov, N., Bissembayev, K., Unsteady Resonant Oscillations of a Gyroscopic Rigid Rotor with Non-linear Damping and Non-linear Rigidity of the Elastic Support. //Mechanisms and Machine Science. – 2021. – Vol.85. – P.83-93 DOI: 10.1007/978-3-030-83594-1_9</p>

25.	Non-isothermal pore change model predicting CO2 adsorption onto consolidated activated carbon	DOI: https://doi.org/10.1016/j.ijheatmasstransfer.2021.121480 (SJR 1,71;Q1, Procentile 98(Chemical Engineering Fluid Flow and Transfer Processes) 95(Engineering Mechanical Engineering) 94(Physics and Astronomy Condensed Matter Physics)).	Accurate simulation and detailed description of the dynamics of the adsorption process play a significant role in forecasting the performance of new materials when used in various adsorption systems, like cooling/heating. The activated carbon (AC) consolidation allows improving the heat transfer rate inside the adsorption/desorption bed and compacting the systems. There are numerous mathematical models in literature for gas adsorption onto granular AC. But for consolidated AC, because of the absence of macropores, most assumptions that work well for granular AC may lead to significant discrepancies. Therefore, the present research proposes a new mathematical model for gas (CO ₂) adsorption onto consolidated adsorbent, a non-isothermal pore change model. The model takes into account the porosity and permeability changes due to the adsorption. The validation of the developed model is performed via comparison with the results obtained experimentally and numerically using an <u>isothermal</u> model. The effective Knudsen diffusion coefficient for the working pair is evaluated from porosity data. The rate of adsorption or mass transfer coefficient is estimated using the van't Hoff plot. The study results could be applied in the development of waste heat-driven cooling systems employing consolidated composite material as the adsorbent. The proposed mathematical model is also applicable for many other working pairs.	Berdanova, B., Pal, A., Saha, B.B., Kaltayev, A., Non-isothermal pore change model predicting CO ₂ adsorption onto consolidated activated carbon. //International Journal of Heat and Mass Transfe. – 2021. – Vol.177. – 121480 DOI: https://doi.org/10.1016/j.ijheatmasstransfer.2021.121480
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26.	The use of the linear form of dynamical equations of the satellite attitude control system for its analysis and synthesis	DOI: https://doi.org/10.15632/jtam-pl/129071 (SJR 0,29;Q3, Procentile 46(Engineering Mechanical Engineering)).	At present, the methods based on using linearized dynamical equations are applied for synthesis of an attitude control system of a satellite with nonlinear dynamics. Linearized equations describe the satellite dynamics approximately, which is the main their disadvantage. This article shows that basing on the angular momentum theorem, the nonlinear dynamical equations of the satellite attitude control system can be represented in the form of linear differential equations with variable coefficients, which makes it possible to use engineering methods of stability analysis and analysis of transient quality in the process of synthesis of the satellite attitude control system.	Moldabekov, M., Sukhenko, A., Shapovalova, D., Yelubayev, S., The use of the linear form of dynamical equations of the satellite attitude control system for its analysis and synthesis. //Journal of Theoretical and Applied Mechanics (Poland). – 2021. – Vol.59(1). – P.109-120 DOI: https://doi.org/10.15632/jtam-pl/129071
27.	Multi-parametric dynamic analysis of a rolling bearings system	DOI:10.5545/sv-jme.2021.7178 (SJR 0,27;Q3, Procentile 47(Engineering Mechanical Engineering) 42(Engineering Mechanics of Materials)).	A method for calculating amplitudes and constructing frequency characteristics of forced and self-excited vibrations of a rotor-fluid-foundation system on rolling bearings with a non-linear characteristic based on the method of complex amplitudes and harmonic balance has been developed. Non-linear equations of motion of the rotor-fluid-foundation system are derived, and analytical methods of their solution are presented. Frequencies of fundamental and ultra-harmonic resonances are determined. The intervals between self-oscillation frequencies are estimated. The dependence of amplitudes on the amount of fluid in the rotor cavity, the mass of the foundation, linear imbalance, the value of the stiffness coefficient, and the damping coefficient is shown. © 2021 Journal of Mechanical Engineering.	Kydyrbekuly, A., Ibrayev, G.-G.A., Ospan, T., Nikonov, A., Multi-parametric dynamic analysis of a rolling bearings system. //Strojniski Vestnik/Journal of Mechanical Engineering. – 2021. – Vol.67(9). – P.421-432 DOI: 10.5545/sv-jme.2021.7178
28.	Modeling the Separation Process	DOI:10.1007/978-3-030-83594-1_11 (SJR 0,16;Q4, Procentile 23(Engineering	In this paper, we study and analyze the features of the separation process in a centrifugal force field, i.e. centrifugation process in vertical	Kydyrbekuly, A.B., Ibrayev, G.E, Modeling the Separation Process in Vertical Rotor

	in Vertical Rotor Systems	Mechanical Engineering) 18(Engineering Mechanics of Materials)).	rotor systems. The main parameters that determine the time of separation of particles are revealed, and the optimal modes are indicated both from a constructive and from an economic point of view. Special cases of a fixed rotor are considered. Nonlinear differential equations of motion of a suspension particle are obtained, which do not have an exact solution. The study is carried out by analytical and numerical methods. The dependences of the slope angles of the tubes on the angular velocity of rotation of the rotor, sedimentation curves that allow one to estimate the time of deposition of particles, as well as the effect of the dispersed composition on the separation process as a whole, are obtained. The results of the study of this work allow us to determine with sufficient accuracy all the necessary characteristics working process of separation and sedimentation, and also allow in certain cases to exclude experimental work. © 2022, The Author(s), under exclusive license to Springer Nature Switzerland AG.	Systems. //Mechanisms and Machine Science. – 2021. – Vol.85. – P.104-113. DOI: 10.1007/978-3-030-83594-1_11
29.	A Comparison of Machine Learning Algorithms in Predicting Lithofacies: Case Studies from Norway and Kazakhstan	DOI:10.3390/en14071896 (SJR 0,6;Q2, Procentile 49(Mathematics Applied Mathematics)23(Engineering Mechanics of Materials)).	Defining distinctive areas of the physical properties of rocks plays an important role in reservoir evaluation and hydrocarbon production as core data are challenging to obtain from all wells. In this work, we study the evaluation of lithofacies values using the machine learning algorithms in the determination of classification from various well log data of Kazakhstan and Norway. We also use the wavelet-transformed data in machine learning algorithms to identify geological properties from the well log data. Numerical results are presented for the multiple oil and gas reservoir data which contain more than 90 released wells from Norway and 10 wells from the Kazakhstan	Merembayev, T., Kurmangaliyev, D., Bekbauov, B., Amanbek, Y., A Comparison of Machine Learning Algorithms in Predicting Lithofacies: Case Studies from Norway and Kazakhstan. //Energies. – 2021. – Vol.14(7). – P.1896 DOI: 10.3390/en14071896

			<p>field. We have compared the the machine learning algorithms including KNN, Decision Tree, Random Forest, XGBoost, and LightGBM. The evaluation of the model score is conducted by using metrics such as accuracy, Hamming loss, and penalty matrix. In addition, the influence of the dataset features on the prediction is investigated using the machine learning algorithms. The result of research shows that the Random Forest model has the best score among considered algorithms. In addition, the results are consistent with outcome of the SHapley Additive exPlanations (SHAP) framework. Copyright: © 2021 by the authors.</p>	
30.	<p>Kinematic synthesis method and eccentricity effects of a Stephenson mechanism</p>	<p>DOI:10.5194/ms-12-1-2021 (SJR 0,31;Q2, Procentile 52(Engineering Industrial and Manufacturing Engineering) 50(Engineering Mechanical Engineering) 48(Engineering Civil and Structural Engineering) 48(Chemical Engineering Fluid Flow and Transfer Processes) 46(Engineering Mechanics of Materials) 45(Engineering Control and Systems Engineering)).</p>	<p>When implementing the technological process on crank presses, it is necessary to provide a predetermined working cycle of the slider motion: fast lifting, dwell, and slow lowering. The cycle cannot be realized without controlling the motor. In addition, using controllable motors increases the manufacturing cost. Due to the geometric and kinematic capabilities of the mechanism, changing the kinematics of the working link is the best choice. Thanks to the use of the Stephenson II mechanism, the slider skew is eliminated due to the parallel connecting rods and the increased area of slider contact. This study presents a numerical method for kinematic synthesis of the Stephenson mechanism that has kinematic advantages. The method is based on mean square deviation which is the minimizing of an objective function. Thanks to the proposed synthesis method, approximate dwell movement can be performed when the slider is on the bottom dead center. In this study, values of the crank length and parallel connecting rods' lengths,</p>	<p>Tuleshov, A., Halicioglu, R., Shadymanova, A., Kuvatova, M., Kinematic synthesis method and eccentricity effects of a Stephenson mechanism. //Mechanical Sciences. – 2021. – Vol.12(1). – P.1-8 DOI: 10.5194/ms-12-1-2021</p>

			angular coordinates of the crank and connecting rods, and the eccentricity of the guide slider relative to the crank rotation axis were obtained. It is observed that eccentricity affects the lower forward and higher backward speed of the slider. The kinematic results of the slider movement are comparatively presented in this article. © 2021 Copernicus GmbH. All rights reserved.	
31.	Structurally Parametric Synthesis of a RoboMech Class Parallel Manipulator with Three DOF	DOI:10.1007/978-3-030-48989-2_40 (SJR 0,172; Q4, Procentile 23(Mechanical Engineering) 18(Mechanics of Materials)).	This paper presents the methods of structural-parametric synthesis of a parallel manipulator with three DOF (Degree of Freedom) working in a cylindrical coordinate system. This parallel manipulator belongs to the RoboMech class because it works under the setting laws of motions of the end-effector and actuators, which simplifies the control system and improves its dynamics. Parallel manipulators of a RoboMech class work with certain structural schemes and geometrical parameters of their links. The considered parallel manipulator is formed by connecting the output object to a base using one passive and two active closing kinematic chains. The geometrical parameters of their links are determined on the base of the least-square approximations. © The Editor(s) (if applicable) and The Author(s), under exclusive license to Springer Nature Switzerland AG 2020.	Baigunchekov, Z., Tarek, S., Patel, S., Mustafa, A., Structurally Parametric Synthesis of a RoboMech Class Parallel Manipulator with Three DOF. //Mechanisms and Machine Science. – 2020. – Vol.84. – P.371-379 DOI: 10.1007/978-3-030-48989-2_40
32.	The First Type of Singularity of a 3-PRRS Parallel Manipulator , 2020, 84, стр. 356–363	DOI:10.1007/978-3-030-48989-2_38 (SJR 0,172; Q4, Procentile 23(Mechanical Engineering) 18(Mechanics of Materials))	In this paper, the first type of singularity of a 3-PRRS parallel manipulator is considered. This type of singularity appears when the determinant of the Jacobian matrix of the generalized velocities goes to zero. In this case, the parallel manipulator loses one or more degrees of freedom (DOF). From the analysis of the degeneracy of the generalized velocities Jacobian matrix, the conditions of the first type	Baigunchekov, Z., Laribi, M.A., Izmambetov, M., Zhumasheva, Z., Kaiyrov, R., The First Type of Singularity of a 3-PRRS Parallel Manipulator. //Mechanisms and Machine Science. – 2020. – Vol.84. – P.356-363 DOI: 10.1007/978-3-030-48989-2_38

			singular configurations are determined. © The Editor(s) (if applicable) and The Author(s), under exclusive license to Springer Nature Switzerland AG 2020.	
33.	Inverse Kinematics of a 3-PRPS Type Parallel Manipulator	DOI:10.1007/978-3-030-48989-2_39 (SJR 0,172; Q4, Procentile 23(Mechanical Engineering) 18(Mechanics of Materials))	In this paper, geometry and inverse kinematics of a 3-PRPS type parallel manipulator are studied. This parallel manipulator is formed by connecting a moving platform with a base by three passive closing kinematic chains of a PRPS type. Constant and variable parameters characterizing the geometry of links and relative movements of elements of kinematic pairs, respectively, are defined, and the matrices of binary links and kinematic pairs are derived. On the base of these matrices of binary links and kinematic pairs, the inverse kinematics problem is solved and numerical results are presented. © The Editor(s) (if applicable) and The Author(s), under exclusive license to Springer Nature Switzerland AG 2020.	Baigunchekov, Z., Zegloul, S., Kassinov, A., Inverse Kinematics of a 3-PRPS Type Parallel Manipulator. //Mechanisms and Machine Science. – 2020. – Vol.84. – P.364-370 DOI: 10.1007/978-3-030-48989-2_39
34.	Structurally parametric synthesis and position analysis of a robomech class parallel manipulator with two end-effectors	DOI: (SJR 0,259; Q3, Procentile 49(Applied Mathematics))	In this paper, the methods of structurally parametric synthesis and position analysis of a RoboMech class parallel manipulator with two end-effectors are presented. This parallel manipulator is formed by connecting the two moving output objects with the fixed base by two passive, one active and two negative closing kinematic chains. Geometrical parameters of the active and negative closing kinematic chains are determined by the Chebyshev and least-square approximations. Position analysis is made on base of the conditional generalized coordinates method. © 2020 International Association of Engineers.	Baigunchekov Z., Naurushev B., Zhumasheva Z., Mustafa A., Kairov R., Amanov B, Structurally parametric synthesis and position analysis of a robomech class parallel manipulator with two end-effectors. //IAENG International Journal of Applied Mathematics. – 2020. – Vol.5. – P.1-11 DOI:
35.	A robomech class parallel manipulator with	DOI:10.15587/1729-4061.2020.203131	This paper presents the methods of structural-parametric synthesis and kinematic analysis of a	Baigunchekov, Z., Mustafa, A., Sobh, T., Patel, S., Utenov, M., A robomech class parallel manipulator with three degrees of

<p>three degrees of freedom 2020, 3(7-105), стр. 44–56</p>	<p>(SJR 0,268; Q3, Procentile 56(Applied Mathematics) 54(Management of Technology and Innovation) 52(Industrial and Manufacturing Engineering) 49(Industrial and Manufacturing Engineering) 46(Industrial and Manufacturing Engineering) 46(Energy Engineering and Power Technology) 45(Computer Science Applications) 44(Control and Systems Engineering))</p>	<p>parallel manipulator with three degrees of freedom working in a cylindrical coordinate system. This parallel manipulator belongs to a RoboMech class because it works under the set laws of motions of the end-effector and actuators, which simplifies the control system and improves its dynamics. Parallel manipulators of a RoboMech class work with certain structural schemes and geometrical parameters of their links. The considered parallel manipulator is formed by connecting the output point to a base using one passive and two active closing kinematic chains (CKC). Passive CKC have zero degree of freedom and it does not impose a geometrical constraint on the movement of the output point, so the geometrical parameters of the links of the passive CKC are freely varied. Active CKCs have active kinematic pairs and they impose geometrical constraints on the movement of the output point. The geometrical parameters of the links of the active CKCs are determined on the basis of the approximation problems of the Chebyshev and least-square approximations. For this, the equations of geometrical constraints are derived in the forms of functions of weighted differences, which are presented in the forms of generalized (Chebyshev) polynomials. This leads to linear iterative problems. The direct and inverse problems of the kinematics of the investigated parallel manipulator are solved. In the direct kinematics problem, the coordinates of the output point are determined by the given position of the input links. In the inverse kinematics problem, the positions of the input links are determined by the coordinates of the output point. The direct and inverse problems of the kinematics of the investigated parallel manipulator are reduced to solving problems on the positions of Sylvester dyads. Numerical results of structural-parametric synthesis and kinematic</p>	<p>freedom. //A robomech class parallel manipulator with three degrees of freedom. – 2020. – Vol.3(7-105). – P.44-56 DOI: 10.15587/1729-4061.2020.203131</p>
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			analysis of the considered parallel manipulator are presented. The numerical results of the kinematic analysis show that the maximum deviation of the movement of the output point from the orthogonal trajectories is 1.65 %	
36.	Direct kinematics of a 3-PRRS type parallel manipulator	DOI: 10.18178/ijmerr.9.7.967-972 (SJR 0,187; Q4, Procentile 23(Mechanical Engineering) 18(Mechanics of Materials))	This paper is devoted to solving the direct kinematics of a novel 3-PRRS type parallel manipulator with six-degrees-of-freedom, where P, R, and S are prismatic, revolute and spherical kinematic pairs respectively. This parallel manipulator is formed by connecting a moving platform with a fixed platform (base) through three closing kinematic chains of a PRRS type in which the prismatic kinematic pairs and their adjacent revolute kinematic pairs are active and they are located on a fixed platform. The constant and variable parameters of the considered parallel manipulator characterizing its geometry and kinematics respectively are determined. In the direct kinematics, the positions of the moving platform are determined by the known constant parameters of the links and the given variable parameters of the active kinematic pairs. An analysis of the obtained equations of the direct kinematics showed that the variable parameters of the active prismatic kinematic pairs are set free, and these equations are reduced to a 16 –order polynomial equation with the passive kinematic pairs variables. Numerical examples of the considered parallel manipulator’s direct kinematics are presented, and the results showed that the direct kinematics equations have four solutions corresponding to the four assemblies of the parallel manipulator.	Baigunchekov, Z.Z., Kaiyrov, R.A., Direct kinematics of a 3-PRRS type parallel manipulator. //International Journal of Mechanical Engineering and Robotics Research. – 2020. – Vol.9(7). – P.967-972 DOI: 10.18178/ijmerr.9.7.967-972
37.	Inverse Kinematics and Workspace of a 3-PRRS Type	DOI:10.1007/978-3-030-75271-2_8 (SJR 0,159; Q4, Procentile 23(Mechanical Engineering) 18(Mechanics of Materials))	In this paper, methods of workspace analysis of a 3-PRRS type parallel manipulator are described. The equations of spheres and circles on these spheres, along which the center of the	Baigunchekov, Z., Laribi, M.A., Kaiyrov, R., Zholdassov, E., Inverse Kinematics and Workspace of a 3-PRRS Type Parallel

	Parallel Manipulator		moving platform can move, are derived, and it is shown that the total reachable area of these spheres is the workspace of the considered parallel manipulator. Numerical examples of defining the workspace of the 3-PRRS type parallel manipulator are presented. © 2021, The Author(s), under exclusive license to Springer Nature Switzerland AG.	Manipulator. //Mechanisms and Machine Science. – 2021. – Vol.103. – P.71-78 DOI: 10.1007/978-3-030-75271-2_8
38.	Kinematic synthesis and analysis of the robomech class parallel manipulator with two grippers , 2021, 10(3), 99	DOI:10.3390/robotics10030099 (SJR 0,390; Q2, Procentile 67(Mechanical Engineering) 70(Control and Optimization) 53(Artificial Intelligence))	In this paper, methods of kinematic synthesis and analysis of the RoboMech class parallel manipulator (PM) with two grippers (end effectors) are presented. This PM is formed by connecting two output objects (grippers) with a base using two passive and one negative closing kinematic chains (CKCs). A PM with two end effectors can be used for reloading operations of stamped products between two adjacent main technologies in a cold stamping line. Passive CKCs represent two serial manipulators with two degrees of freedom, and negative CKC is a three- joined link with three negative degrees of freedom. A negative CKC imposes three geometric constraints on the movements of the two output objects. Geometric parameters of the negative CKC are determined on the basis of the problems of the Chebyshev and least- square approximations. Problems of positions and analogues of velocities and accelerations of the PM with two end effectors have been solved. © 2021 by the authors. Licensee MDPI, Basel, Switzerland.	Baigunchekov, Z., Laribi, M.A., Mustafa, A., Kassinov, A., Kinematic synthesis and analysis of the robomech class parallel manipulator with two grippers . //Robotics. – 2021. – Vol.10(3). – P.99 DOI: 10.3390/robotics10030099
39.	Structural-parametric synthesis of the robomech class parallel mechanism with two sliders	DOI:10.3390/app11219831 (SJR 0,435; Q2, Procentile 71(General Engineering) 62(Instrumentation) 59(Fluid Flow and Transfer Processes) 56(Computer Science Applications) 51(General Materials Science) 50(Process Chemistry and Technology))	This paper addresses the structural-parametric synthesis and kinematic analysis of the RoboMech class of parallel mechanisms (PM) having two sliders. The proposed methods allow the synthesis of a PM with its structure and geometric parameters of the links to obtain the given laws of motions of the input and output links (sliders). The paper outlines a	Baigunchekov, Z., Laribi, M.A., Carbone, G., Mustafa A., Amanov, B., Zholdassov, Y., Structural-parametric synthesis of the robomech class parallel mechanism with two sliders. //Applied Sciences (Switzerland). – 2021. – Vol.11(21). – P.9831

			possible application of the proposed approach to design a PM for a cold stamping technological line. The proposed PM is formed by connecting two sliders (input and output objects) using one passive and one negative closing kinematic chain (CKC). The passive CKC does not impose a geometric constraint on the movements of the sliders and the geometric parameters of its links are varied to satisfy the geometric constraint of the negative CKC. The negative CKC imposes one geometric constraint on the movements of the sliders and its geometric parameters are determined on the basis of the Chebyshev and least-square approximations. Problems of positions and analogues of velocities and accelerations of the considered PM are solved to demonstrate the feasibility and effectiveness of the proposed formulations and case of study. © 2021 by the authors. Licensee MDPI, Basel, Switzerland.	DOI: 10.3390/app11219831
40.	Non-isothermal pore change model predicting CO ₂ adsorption onto consolidated activated carbon	DOI:10.1016/j.ijheatmasstransfer.2021.121480 (SJR 1,713; Q1, Procentile 98(Fluid Flow and Transfer Processes) 95(Mechanical Engineering) 94(Condensed Matter Physics))	Accurate simulation and detailed description of the dynamics of the adsorption process play a significant role in forecasting the performance of new materials when used in various adsorption systems, like cooling/heating. The activated carbon (AC) consolidation allows improving the heat transfer rate inside the adsorption/desorption bed and compacting the systems. There are numerous mathematical models in literature for gas adsorption onto granular AC. But for consolidated AC, because of the absence of macropores, most assumptions that work well for granular AC may lead to significant discrepancies. Therefore, the present research proposes a new mathematical model for gas (CO ₂) adsorption onto consolidated adsorbent, a non-isothermal pore change model. The model takes into account the porosity and	Berdenova, B., Pal, A., Saha, B.B., Kaltayev, A., Non-isothermal pore change model predicting CO ₂ adsorption onto consolidated activated carbon . //International Journal of Heat and Mass Transfer. – 2021. – Vol.177. – P.121480 DOI: 10.1016/j.ijheatmasstransfer.2021.121480

			<p>permeability changes due to the adsorption. The validation of the developed model is performed via comparison with the results obtained experimentally and numerically using an isothermal model. The effective Knudsen diffusion coefficient for the working pair is evaluated from porosity data. The rate of adsorption or mass transfer coefficient is estimated using the van't Hoff plot. The study results could be applied in the development of waste heat-driven cooling systems employing consolidated composite material as the adsorbent. The proposed mathematical model is also applicable for many other working pairs. © 2021 Elsevier Ltd</p>	
41.	Multi-parametric dynamic analysis of a rolling bearings system	DOI:10.5545/sv-jme.2021.7178 (SJR 0,271; Q3, Procentile 47(Mechanical Engineering) 42(Mechanics of Materials))	<p>A method for calculating amplitudes and constructing frequency characteristics of forced and self-excited vibrations of a rotor-fluid-foundation system on rolling bearings with a non-linear characteristic based on the method of complex amplitudes and harmonic balance has been developed. Non-linear equations of motion of the rotor-fluid-foundation system are derived, and analytical methods of their solution are presented. Frequencies of fundamental and ultra-harmonic resonances are determined. The intervals between self-oscillation frequencies are estimated. The dependence of amplitudes on the amount of fluid in the rotor cavity, the mass of the foundation, linear imbalance, the value of the stiffness coefficient, and the damping coefficient is shown. © 2021 Journal of Mechanical Engineering.</p>	<p>Kydyrbekuly, A., Ibrayev, G.-G.A., Ospan, T., Nikonov, A., Multi-parametric dynamic analysis of a rolling bearings system. //Strojniski Vestnik/Journal of Mechanical Engineering. – 2021. – Vol.67(9). – P.421-432 DOI: 10.5545/sv-jme.2021.7178</p>
42.	Modeling the Separation Process in Vertical Rotor Systems	DOI:10.1007/978-3-030-83594-1_11 (SJR 0,159; Q4, Procentile 23(Mechanical Engineering) 18(Mechanics of Materials))	<p>In this paper, we study and analyze the features of the separation process in a centrifugal force field, i.e. centrifugation process in vertical rotor systems. The main parameters that determine the time of separation of particles</p>	<p>Kydyrbekuly, A.B., Ibrayev, G.E., Modeling the Separation Process in Vertical Rotor Systems. //Mechanisms and</p>

			<p>are revealed, and the optimal modes are indicated both from a constructive and from an economic point of view. Special cases of a fixed rotor are considered. Nonlinear differential equations of motion of a suspension particle are obtained, which do not have an exact solution. The study is carried out by analytical and numerical methods. The dependences of the slope angles of the tubes on the angular velocity of rotation of the rotor, sedimentation curves that allow one to estimate the time of deposition of particles, as well as the effect of the dispersed composition on the separation process as a whole, are obtained. The results of the study of this work allow us to determine with sufficient accuracy all the necessary characteristics working process of separation and sedimentation, and also allow in certain cases to exclude experimental work. © 2022, The Author(s), under exclusive license to Springer Nature Switzerland AG.</p>	<p>Machine Science. – 2021. – Vol.85. – P.104-113 DOI: 10.1007/978-3-030-83594-1_11</p>
43.	Structural-parametric synthesis of the robomech class parallel mechanism with two sliders	DOI:10.3390/app11219831 (SJR 0,435; Q2, Procentile 71(General Engineering) 62(Instrumentation) 59(Fluid Flow and Transfer Processes) 56(Computer Science Applications) 51(General Materials Science) 50(Process Chemistry and Technology))	<p>This paper addresses the structural-parametric synthesis and kinematic analysis of the RoboMech class of parallel mechanisms (PM) having two sliders. The proposed methods allow the synthesis of a PM with its structure and geometric parameters of the links to obtain the given laws of motions of the input and output links (sliders). The paper outlines a possible application of the proposed approach to design a PM for a cold stamping technological line. The proposed PM is formed by connecting two sliders (input and output objects) using one passive and one negative closing kinematic chain (CKC). The passive CKC does not impose a geometric constraint on the movements of the sliders and the geometric parameters of its links are varied to satisfy the geometric constraint of the negative CKC. The</p>	<p>Baigunchekov, Z., Laribi, M.A., Carbone, G., Mustafa A., Amanov, B., Zholdassov, Y., Structural-parametric synthesis of the robomech class parallel mechanism with two sliders. //Applied Sciences (Switzerland). – 2021. – Vol.11(21). – P.9831 DOI: 10.3390/app11219831</p>

			negative CKC imposes one geometric constraint on the movements of the sliders and its geometric parameters are determined on the basis of the Chebyshev and least-square approximations. Problems of positions and analogues of velocities and accelerations of the considered PM are solved to demonstrate the feasibility and effectiveness of the proposed formulations and case of study. © 2021 by the authors. Licensee MDPI, Basel, Switzerland.	
44.	Impact of loading rate on asphalt concrete deformation and failure	DOI:10.18720/MCE.100.8 (SJR 0,4; Q3, Procentile 81(Building and Construction) 79(Civil and Structural Engineering))	The results for experimental determination of characteristics have been given and analyzed in this article for deformation and failure of an asphalt concrete at eleven loading rates from 0.000563 MPa/s to 0.652 MPa/s differing in 1158 times. A hot fine-grained dense asphalt concrete of type B prepared with a viscous bitumen of grade BND 100/130 which is traditionally used in road construction has been selected for the research. The tests have been performed at the temperature of 22–24 °C in a specially invented and assembled device according to the scheme of direct tension. The asphalt concrete samples had a shape of rectangular beam with dimensions 5×5×15 cm. It is found that from the moment of loading to the moment of failure the asphalt concrete is deformed nonlinearly. The rate of nonlinearity is increased with the load increase. Loading rate effects greatly the characteristics of deformation and failure of the asphalt concrete: failure time, specific work of deformation and failure deformation are decreased in 242, 160 and 3 times respectively at the loading rate increase in 1158 (nearly 1200) times from 0.000563 MPa/s to 0.652 MPa/s and the strength is increased in 5 times. Dependences for characteristics of the asphalt concrete failure (failure time, failure	Iskakbayev, A., Teltayev, B., Rossi, C.O., Yensebayeva, G.Abu B.,Kutimov K.,,Impact of loading rate on asphalt concrete deformation and failure. //Magazine of Civil Engineering. – 2020. – Vol.100(8). – P.10008 DOI: 10.18720/MCE.100.8

			deformation, specific work of deformation and strength) on a loading rate are described with a high accuracy by power functions. © Iskakbayev, A., Teltayev, B.B., Rossi, C.O., Yensebayeva, G., Abu, B., Kutimov, K.S., 2020.	
45.	Modeling of hereditary materials relaxation by Abel Kernel	DOI:10.32014/2020.2518-170X.154 (SJR 0,323; Q3, Procentile 40(Geology) 37(Geotechnical Engineering and Engineering Geology))		Zhurinov, M.Zh., Iskakbayev, A.I., Teltayev, B.B., Kutimov, K.S., Modeling of hereditary materials relaxation by Abel Kernel. //News of the National Academy of Sciences of the Republic of Kazakhstan, Series of Geology and Technical Sciences. – 2020. – Vol.6(444). – P.254-260 DOI: 10.32014/2020.2518-170X.154
46.	Long-term strength of asphalt concrete and its applications 2020, 244, 118325	DOI:10.1016/j.conbuildmat.2020.118325 (SJR 1,662; Q1, Procentile 95(Civil and Structural Engineering) 94(Geotechnical Engineering and Engineering Geology Building and Construction) 87(General Materials Science))	An international journal dedicated to the investigation and innovative use of materials in construction and repair. Construction and Building Materials provides an international forum for the dissemination of innovative and original research and development in the field of construction and building materials and their application in new works and repair practice. The journal publishes a wide range of innovative research and application papers which describe laboratory and to a limited extent numerical investigations or report on full scale projects. Multi-part papers are discouraged. Construction and Building Materials also publishes detailed case studies and some incisive review articles that contribute new understandings. We are focusing on construction materials papers and we exclude papers on structural engineering, geotechnics and unbound highway layers. The construction materials and technology covered include: cement, concrete reinforcement, bricks and mortars, additives, corrosion technology, ceramics, timber, steel, polymers, glass fibres,	Iskakbayev, A.I., Teltayev, B.B., Yestayev, K.Z., Abu, B.D., Long-term strength of asphalt concrete and its applications. //Construction and Building Materials. – 2020. – Vol.244. – P.118325 DOI: 10.1016/j.conbuildmat.2020.118325

			recycled materials, bamboo, rammed earth, non-conventional building materials, bituminous materials and railway material applications. The scope of Construction and Building Materials includes, but is not restricted to, materials, NDT and monitoring aspects of new works and repair and maintenance of the following: bridges, high-rise buildings, dams, civil engineering structures, silos, highway pavements, tunnels, water containment structures, sewers, roofing, housing, coastal defences and railways.	
47.	Numerical simulation on solar collector and cascade heat pump combi water heating systems in Kazakhstan climates	DOI: 10.1016/j.renene.2019.06.102 (SJR 2,052; Q1, Procentile 88(Renewable Energy, Sustainability and the Environment))	At low ambient temperatures, the heating capacity and coefficient of performance of a single stage vapour compression heat pump cycle is significantly getting reduced. The two stage cascade heat pump cycle operating with two different refrigerants provides a sustainable solution to lift the condenser temperature above 343 K. In this work, a numerical simulation model was developed for predicting the performance of a solar collector and two stage cascade heat pump combi water heating systems under Kazakhstan climatic conditions. The numerical simulation was performed for winter climatic conditions using nine refrigerant pairs such as, R32/R290, R32/R1234yf, R32/R134a, R410A/R290, R410A/R1234yf, R410A/R134a, R744/R290, R744/R1234yf and R744/R134a. The influences of solar irradiation, ambient temperature and condenser temperature are discussed. The solar collector and two stage heat pump combi heating system has about 30% energy savings when compared to the conventional two stage cascade heat pump without integration solar collectors. The R32/R290 refrigerant pair is having maximum coefficient of performance of 2.4 at 323 K	Yerdeshe, Y., Abdulina, Z., Aliuly, A., Belyayev Y., Mohanraj, M., Kaltayev, A., Numerical simulation on solar collector and cascade heat pump combi water heating systems in Kazakhstan climates. //Renewable Energy. – 2020. – Vol.145. – P.1222-1234 DOI: 10.1016/j.renene.2019.06.102

			condensing temperature and 263 K evaporating temperature. The refrigerant R744/R290 pair is identified as an environment friendly sustainable option in terms of its global warming impact for two stage cascade heat pump applications. © 2019	
48.	A GPU-accelerated Simulator of Turbulent Reacting Flows	DOI: 10.1080/10618562.2020.1787996 (SJR 0,470; Q2, Procentile 60(Computational Mechanics) 57(Aerospace Engineering) 53(Mechanical Engineering) 51(Energy Engineering and Power Technology) 49(Mechanics of Materials) 43(Condensed Matter Physics))	A new computational methodology is developed for large eddy simulation (LES) of turbulent reacting flows using graphic processing units (GPUs). The LES is based on the filtered density function (FDF) of the scalar-composition in conjunction with a discontinuous Galerkin (DG) discretisation scheme on a structured rectangular mesh. This hybrid solver is developed in a manner suitable for GPU computing. The simulator, as devised, is shown to be of the order of 200 times faster than the serial CPU-based calculations; facilitating the use of FDF for practical applications. The consistency and the accuracy of the methodology are demonstrated by simulations of a temporally developing mixing layer, under both non-reacting and reacting conditions. © 2020, © 2020 Informa UK Limited, trading as Taylor & Francis Group.	Inkarbekov, M., Aitzhan, A., Kaltayev, A., Sammak, S., A GPU-accelerated Simulator of Turbulent Reacting Flows. //International Journal of Computational Fluid Dynamics. – 2020. – P.381-396 DOI: 10.1080/10618562.2020.1787996
49.	Numerical Solution of the Inverse Pharmacokinetic Problem for the Three-Compartment Model	(SJR 0,19; Q 3, Procentile 43 (Engineering: General Engineering))	This article considers the numerical solution of the inverse pharmacokinetics problem for a three-compartment linear model. First, the article presents some reviews of the pharmacokinetics problem and the three-compartment model. The following describes the formulation of the pharmacokinetics problem for a three-compartment linear model. The direct problem is the Cauchy problem for systems of ordinary differential equations. Solving the direct problem analytically, we find the concentration for the	Authors: Syrym Kasenov, Bidaulet Urmashov, Almas Temirbekov and Aidana Amantayeva Title: {Numerical Solution of the Inverse Pharmacokinetic Problem for the Three- Compartment Model} JOURNAL OF Engineering Science and Technology Review Выпуск SpecialIssue, Страницы 123 - 126

			<p>first compartment, since it is the object of the study. The formulation of the inverse problem is reduced to a nonlinear operator equation. For the inverse problem, seven coefficients concentration for the first compartment should be found for some additional information of a given concentration. The inverse problem is reduced to minimizing the objective functional. For the numerical solution, an adaptive search method is used genetic algorithm. The numerical results of this problem are given. © 2020. School of Science, IHU. All rights reserved.</p>	<p>Received 26 September 2019; Accepted 27 February 2020</p>
50.	<p>Numerical Solution of the Inverse Pharmacokinetic Problem for the Three-Compartment Model</p>	<p>(SJR 0,189; Q 3, Procentile 43 (Engineering: General Engineering))</p>	<p>This article considers the numerical solution of the inverse pharmacokinetics problem for a three-compartment linear model. First, the article presents some reviews of the pharmacokinetics problem and the three-compartment model. The following describes the formulation of the pharmacokinetics problem for a three-compartment linear model. The direct problem is the Cauchy problem for systems of ordinary differential equations. Solving the direct problem analytically, we find the concentration for the first compartment, since it is the object of the study. The formulation of the inverse problem is reduced to a nonlinear operator equation. For the inverse problem, seven coefficients concentration for the first compartment should be found for some additional information of a given</p>	<p>Authors: Syrym Kasenov, Baidalet Urmashev, Almas Temirbekov and Aidana Amantayeva Title: Numerical Solution of the Inverse Pharmacokinetic Problem for the Three-Compartment Model JOURNAL OF Engineering Science and Technology Review Выпуск SpecialIssue, Страницы 123 - 126 Received 26 September 2019; Accepted 27 February 2020</p>

			concentration. The inverse problem is reduced to minimizing the objective functional. For the numerical solution, an adaptive search method is used genetic algorithm. The numerical results of this problem are given. © 2020. School of Science, IHU. All rights reserved.	
51.	Theorem of Furstenberg type for multiplicative stochastic integrals	DOI: 10.1515/rose-2020-2035 (SJR 0,355; Q 3, Procentile "17 (Mathematics: Analysis), 16 (Mathematics: Statistics and Probability)"	This paper contains the proof of the positivity of the top Lyapunov exponent for the multiplicative stochastic integrals related to the diffusion processes on the Lee algebra of the matrices with zero trace. © 2020 De Gruyter. All rights reserved	Authors: N. Akanbay, Stanislav Molchanov, Z. I. Suleimenova Title: {Theorem of Furstenberg type for multiplicative stochastic integrals} September 2020 Random Operators and Stochastic, Том 28, Выпуск 3, Equations 28(3):163-175 DOI: 10.1515/rose-2020-2035
52.	Inverse Kinematics of a 3-PRPS Type Parallel Manipulator	DOI: 10.1007/978-3-030-48989-2_39 (SJR 0,39; Q 3, Procentile "23 (Engineering: Mechanical Engineering), 18 (Engineering: Mechanics of Materials)"	In this paper, geometry and inverse kinematics of a 3-PRPS type parallel manipulator are studied. This parallel manipulator is formed by connecting a moving platform with a base by three passive closing kinematic chains of a PRPS type. Constant and variable parameters characterizing the geometry of links and relative movements of elements of kinematic pairs, respectively, are defined, and the matrices of binary links and kinematic pairs are derived. On the base of these matrices of binary links and kinematic pairs, the inverse kinematics problem is solved and numerical results are presented. © The Editor(s) (if applicable) and The Author(s), under	Authors: Zhumadil Baigunchekov, Said Zeghloul, Abzal Kassinov Title: {Inverse Kinematics of a 3-PRPS Type Parallel Manipulator} June 2020 In book: Advances in Service and Industrial Robotics (pp.364-370) Том 84 Mechanisms and Machine Science, DOI: 10.1007/978-3-030-48989-2_39

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53.	Geometry and Inverse Kinematics of 3-PRRS Type Parallel Manipulator	DOI: 10.1007/978-3-030-19648-6_2 (SJR 0,184; Q 3, Procentile "27 (Computer Science: General Computer Science), 22 (Engineering: Control and Systems Engineering)"	In this paper the methods of structural synthesis and inverse kinematics of 3-PRRS type parallel manipulator (PM) are developed. This PM is formed by connecting of a moving platform with a fixed base by three passive closing kinematic chains of PRRS type. Constant and variable parameters characterizing the geometry of links and relative motions of elements of joints are defined. Inverse kinematics of the PM is solved of the basis of solution of the loop-closure matrix equations of the legs. © Springer Nature Switzerland AG 2020	Authors: Zhumadil Baigunchekov, med amine Laribi, Azamat Mustafa, Rustem Kaiyrov, Amanov, Bekzat, Abzal Kassinov Title: {Geometry and Inverse Kinematics of 3-PRRS Type Parallel Manipulator} January 2020 In book: Coral Reefs of the Red Sea (pp.12-18) Advances in Intelligent Systems and Computing, Tom 980 DOI:10.1007/978-3-030-19648-6_2
54.	Time-harmonic dynamics of curved beams	DOI:10.1007/978-3-030-41057-5_52 (SJR 0,15; Q 4, Procentile "17 (Engineering: Aerospace Engineering), 17 (Engineering: Mechanical Engineering), 15 (Engineering: Automotive Engineering)"	Wave propagation along a curved Euler-Bernoulli beam is considered. The dispersion relation is derived and its roots are given in analytical form and described in the complex plane. In contrast to straight beams, in the low-frequency regime three propagating modes coexist and a special zero-frequency bifurcated configuration is present, when the wavenumber magnitude is equal to the curvature of the cen-troid axis of the structure. The first frequency regime is followed by a second regime where a single propagating mode is present, in which longitudinal and transverse waves are strongly coupled. The broadband coupling between longitudinal and transverse waves is also quantified. Finally the transmission	Authors: Bibinur Meirbekova, Michele Brun, Vincent Pagneux Title: {Time-Harmonic Dynamics of Curved Beams} March 2020 In book: Proceedings of XXIV AIMETA Conference 2019 (pp.638-651) Lecture Notes in Mechanical Engineering DOI:10.1007/978-3-030-41057-5_52

			properties of the structure are characterized evidencing a transition between a low and high frequency regime. In the low frequency/high curvature regimes strong coupling between longitudinal and transverse mode is present, while in the high frequency/low curvature regime such coupling is absent. © Springer Nature Switzerland AG 2020.	
55.	GMRES based numerical simulation and parallel implementation of multicomponent multiphase flow in porous media	DOI:10.1080/23311916.2020.1785189 (SJR 0,312; Q 2, Procentile "67 (Engineering: General Engineering), 62 (Computer Science: General Computer Science), 52 (Chemical Engineering: General Chemical Engineering)"	This article considered the numerical simulation of multicomponent multiphase flow in porous media. The resulting system of nonlinear equations linearized by the Newton-Raphson method and solved with the iterative Generalized minimal residual method (GMRES) algorithm. To achieve better convergence, we used the ILU(0) preconditioner to the GMRES algorithm. As a result, we used a completely implicit scheme called the Newton-ILU0-GMRES algorithm to solve the problem of interest. Based on the obtained sequential algorithm, we implemented a parallel algorithm using Message Passing Interface (MPI) technology. Additionally, we made comparisons between the parallel program of the presented algorithm and the parallel program using the ready-made Portable Extensible Toolkit for Scientific Computation (PETSc) library. We developed an MPI parallel algorithm and tested it on the MVS-10P supercomputer of the Interdepartmental Supercomputer Center of the Russian Academy of Sciences. © 2020,	Authors: Saltanbek T. Mukhambetzhonov D.V. Lebedev, Nurislam Kassymbek, Timur Imankulov, Akhmed-Zaki, Darkhan Zh, Matkerim Bazargul Title: {GMRES based numerical simulation and parallel implementation of multicomponent multiphase flow in porous media} Cogent Engineering, Том 7, Выпуск 1 January 2020 DOI:10.1080/23311916.2020.1785189

			© 2020 The Author(s). This open access article is distributed under a Creative Commons Attribution (CC-BY) 4.0 license.	
56.	Determination of the main parameters of the photovoltaic solar module	DOI:10.12720/sgce.9.1.162-169 (SJR 0,203; Q , Procentile "25 (Energy: General: Energy), 20 (Environmental Science: General Environmental Science), 19 (Earth and Planetary Sciences: General Earth and Planetary Sciences)"	This article deals with the determination of the main operating parameters of a photovoltaic solar module. In laboratory tests, the study of the dependence of current, voltage and power on time and density of solar radiation, as well as monitoring of environmental parameters: temperature and humidity of the outside air. Analysis of the test results shows that a photoelectric module with an installed capacity of 800 W and a total battery capacity of 800 Ah provides the electric power industry with a daily consumption of 2.0.. 2.2 kWh. The discharge time of the battery varies from 11.7 to 3.5 hours when the average electric load of the consumer changes from 300 to 1000 watts. © 2020 The Authors, published by EDP Sciences	Authors: Baydaulet A. Urmashev, Murat Kunelbayev, Almas N. Temirbekov, Syrym Kassenov, Zhadra Zhaksylykova, Farida Amenova Title: {Determination of the main parameters of the photovoltaic solar module} E3S Web of Conferences, Том 191 January 2020 International Journal of Smart Grid and Clean Energy DOI:10.12720/sgce.9.1.162-169
57.	Numerical Solution of the Inverse Pharmacokinetic Problem for the Three-Compartment Model	(SJR 0,19; Q 3, Procentile "43 (Engineering: General Engineering)"	This article considers the numerical solution of the inverse pharmacokinetics problem for a three-compartment linear model. First, the article presents some reviews of the pharmacokinetics problem and the three-compartment model. The following describes the formulation of the pharmacokinetics problem for a three-compartment linear model. The direct problem is the Cauchy problem for systems of ordinary differential equations. Solving the direct problem analytically, we find the concentration for the	Authors: S. Kasenov, B. Urmashev, A. Temirbekov and A. Amantayeva Title: {Numerical Solution of the Inverse Pharmacokinetic Problem for the Three- Compartment Model} Journal of Engineering Science and Technology ReviewВыпуск Special Issue, Страницы 122 – 126, 2020

			<p>first compartment, since it is the object of the study. The formulation of the inverse problem is reduced to a nonlinear operator equation. For the inverse problem, seven coefficients concentration for the first compartment should be found for some additional information of a given concentration. The inverse problem is reduced to minimizing the objective functional. For the numerical solution, an adaptive search method is used genetic algorithm. The numerical results of this problem are given. © 2020 School of Science, IHU. All Rights Reserved</p>	
58.	<p>On the use of the loud platform in the work of the scientific and educational cluster</p>	<p>DOI: 10.24425-ijet.2020.135676/768 (SJR 0,174; Q 4, Procentile "28 (Engineering: Electrical and Electronic Engineering), 27 (Computer Science: Computer Networks and Communications)"</p>	<p>The process of designing and creating an integrated distributed information system for storing digitized works of scientists of research institutes of the Almaty academic city is analyzed. The requirements for the storage of digital objects are defined; a comparative analysis of the open source software used for these purposes is carried out. The system fully provides the necessary computing resources for ongoing research and educational processes, simplifying the prospect of its further development, and allows to build an advanced IT infrastructure for managing intellectual capital, an electronic library that is intended to store all books and scientific works of the Kazakhstan Engineering Technological University and research institutes of the Almaty academic city. © The Author(s). This is an open-access</p>	<p>Authors: Nurlan M. Temirbekov, Tahir M. Takabayev, Dossan R. Baigereyev, Waldemar Wójcik, Konrad Gromaszek, Almas N. Temirbekov, and Bakytzhan B. Omirzhanova Title: {On the Use of the Loud Platform in the Work of the Scientific and Educational Cluster } Czasopismo International Journal of Electronics and Telecommunications Rocznik 2020 Tom Vol. 66, No. 4 Strony 629--634 Opis fizyczny Bibliogr. 16 poz., schem. DOI: 10.24425-ijet.2020.135676/768</p>

			article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0, https://creativecommons.org/licenses/by/4.0/), which permits use, distribution, and reproduction in any medium, provided that the Article is properly cited.	
59.	Development of a Distributed Information System of the Almaty Academgorodok	(SJR 0,189; Q 3, Procentile "43 (Engineering:General Engineering)"	The present article describes the architecture of an integrated distributed information system used to store and manage digitized works of employees of research institutes of the Almaty Academgorodok. The Ceph open source software object storage network is used as data storage. Testing of the POSIX-compatible CephFS file system abstraction is performed. The software part of the information system consists of four subsystems: repository of digital objects, subsystem for managing current research information, subsystem of integration of distributed information resources, subsystem of access to distributed information resources based on web technologies. The description of the software part of the information system is provided. Integration between the subsystems of the information system is performed. © 2020 School of Science, IHU. All Rights Reserved.	Authors: Temirbekov N., Baigereyev D., Temirbekov A, Omirzhanova B. Title: {Development of a Distributed Information System of the Almaty Academgorodok} Journal of Engineering Science and Technology Review Выпуск Special Issue, Страницы 127 – 130, 2020
60.	Numerical Solution of the Inverse Pharmacokinetic Problem for the	(SJR 0,19; Q 3, Procentile "43 (Engineering: General Engineering)"	This article considers the numerical solution of the inverse pharmacokinetics problem for a three-compartment linear model. First, the article presents some reviews of the pharmacokinetics problem and the three-	Authors: Syrym Kasenov, Baidalet Urmashiev, Almas Temirbekov and Aidana Amantayeva

	<p>Three-Compartment Model</p>		<p>compartment model. The following describes the formulation of the pharmacokinetics problem for a three-compartment linear model. The direct problem is the Cauchy problem for systems of ordinary differential equations. Solving the direct problem analytically, we find the concentration for the first compartment, since it is the object of the study. The formulation of the inverse problem is reduced to a nonlinear operator equation. For the inverse problem, seven coefficients concentration for the first compartment should be found for some additional information of a given concentration. The inverse problem is reduced to minimizing the objective functional. For the numerical solution, an adaptive search method is used genetic algorithm. The numerical results of this problem are given. © 2020 School of Science, IHU. All Rights Reserved.</p>	<p>Title: {Numerical Solution of the Inverse Pharmacokinetic Problem for the Three- Compartment Model} JOURNAL OF Engineering Science and Technology Review Выпуск Special Issue, Страницы 122 – 126, 2020</p>
61.	<p>Determination of the main parameters of the photovoltaic solar module</p>	<p>DOI:10.12720/sgce.9.1.162-169 (SJR 0,203; Q , Procentile "25 (Energy: General Energy), 20 (Environmental Science: General Environmental Science), 19 (Earth and Planetary Sciences: General Earth and Planetary Sciences)"</p>	<p>This article deals with the determination of the main operating parameters of a photovoltaic solar module. In laboratory tests, the study of the dependence of current, voltage and power on time and density of solar radiation, as well as monitoring of environmental parameters: temperature and humidity of the outside air. Analysis of the test results shows that a photoelectric module with an installed capacity of 800 W and a total battery capacity of 800 Ah provides the electric power industry with a daily</p>	<p>Authors: Baydaulet A. Urmashiev, Murat Kunelbayev, Almas N. Temirbekov, Syrym Kassenov, Zhaksylykova, Zhadra R., Amenova, Farida Title: {Determination of the main parameters of the photovoltaic solar module} January 2020 International Journal of Smart Grid and Clean Energy E3S Web of Conferences, Том 191</p>

			consumption of 2.0.. 2.2 kWh. The discharge time of the battery varies from 11.7 to 3.5 hours when the average electric load of the consumer changes from 300 to 1000 watts. © 2020 The Authors, published by EDP Sciences.	DOI:10.12720/sgce.9.1.162-169
62.	Cogeneration Plants with Solar Radiation Concentrators	DOI: 10.1134/S0040601520100079 (SJR 0,602; Q 2, Procentile 53 (Energy: Nuclear Energy and Engineering), 42 (Energy: Energy Engineering and Power Technology)	abstract: Results from experimental studies of a solar cogeneration system with linear photovoltaic modules of a fundamentally new design are presented. The Λ -shaped frontal walls are installed face-to-face at an angle to each other and mutually shield their own thermal radiation, which decreases the radiation heat losses by 27% compared with linear photovoltaic modules of the known designs. The photocurrent generated by cooled solar cells is directed to a system for charging chemical batteries and the thermal energy released is transmitted to the unconsumed intermediate heat-transfer fluid and then, through the surface of coil pipes of counter-current heat exchangers, to the consumed process water of the outer circulation circuit. The further transportation of thermal energy to the storage system occurs by natural circulation of the consumed process water through the temperature gradient formed by the control system over the height between the heat source, the heat exchanger, and the heat receiver, an insulated container (a heat accumulator). For the first time, efficient controlled transportation of heat has been implemented without using a	Authors: P. A. Nesterenkova, A. G. Nesterenkovb, and A. N. Temirbekova Title: {Cogeneration Plants with Solar Radiation Concentrators} Thermal Engineering, 2020, Vol. 67, No. 10, pp. 706–714. DOI: 10.1134/S0040601520100079

			<p>circulation pump owing to the excess thermal energy released during the conversion of solar energy by the solar cells and a photo-selective film installed in the focal spot of the optical concentrator. Thus, a possibility of increasing the temperature of the heat-transfer fluids at the cogeneration system outlet has been offered. A two-circuit circulation system allows for separation of unconsumed heat-transfer fluids (antifreezing solutions) and the consumed fluid (the process water) by the pressure in the channels and installation of a linear counter-current heat exchanger that performs the functions of a supporting platform's mechanical axis along the rotational axis of the optical concentrator. The system uses a dual-axis solar tracking concentrating system comprised of flat mirrors installed at an angle to the horizon. The arrangement of the Λ-shaped photovoltaic modules on the supporting framework in series along the heat-transfer-fluid path allows for a reduction in the overall dimensions of the channels, an increase in the total efficiency of the solar cells, and simplification of the encapsulation technology. A method for calculating the output of the cogeneration plant is provided. The method is based on the experimentally measured characteristics of silicon solar cells and heat losses in the channels of the linear photovoltaic modules. © 2020, Pleiades Publishing, Inc.</p>	
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63.	Development of a Distributed Information System of the Almaty Academgorodok	(SJR 0,19; Q 3, Procentile 43 (Engineering: General Engineering)	The present article describes the architecture of an integrated distributed information system used to store and manage digitized works of employees of research institutes of the Almaty Academgorodok. The Ceph open source software object storage network is used as data storage. Testing of the POSIX-compatible CephFS file system abstraction is performed. The software part of the information system consists of four subsystems: repository of digital objects, subsystem for managing current research information, subsystem of integration of distributed information resources, subsystem of access to distributed information resources based on web technologies. The description of the software part of the information system is provided. Integration between the subsystems of the information system is performed. © 2020 School of Science, IHU. All Rights Reserved.	Authors: Temirbekov N., Baigereyev D., Temirbekov A., Omirzhanova B. Development of a Distributed Information Title: {System of the Almaty Academgorodok} Journal of Engineering Science and Technology Review Выпуск Special Issue, Страницы 127 – 130, 2020
64.	On the use of the loud platform in the work of the scientific and educational cluster	DOI: 10.24425/ijet.2020.135676 (SJR 0,174; Q 4, Procentile "28 (Engineering: Electrical and Electronic Engineering), 27 (Computer Science: Computer Networks and Communications)"	The process of designing and creating an integrated distributed information system for storing digitized works of scientists of research institutes of the Almaty academic city is analyzed. The requirements for the storage of digital objects are defined; a comparative analysis of the open source software used for these purposes is carried out. The system fully provides the necessary computing resources for ongoing research and educational processes, simplifying the prospect of its further development, and	Authors: Nurlan M. Temirbekov, Tahir M. Takabayev, Dossan R. Baigereyev, Waldemar Wójcik, Konrad Gromaszek, Almas N. Temirbekov, and Bakytzhan B. Omirzhanova Title: {On the use of the loud platform in the work of the scientific and educational cluster} JOURNAL OF ELECTRONICS AND TELECOMMUNICATIONS, 2020, VOL. 66, NO. 4, PP. 629-634

			allows to build an advanced IT infrastructure for managing intellectual capital, an electronic library that is intended to store all books and scientific works of the Kazakhstan Engineering Technological University and research institutes of the Almaty academic city. © The Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0, https://creativecommons.org/licenses/by/4.0/), which permits use, distribution, and reproduction in any medium, provided that the Article is properly cited	Manuscript received September 7, 2020; revised November, 2020. DOI: 10.24425/ijet.2020.135676
65.	Reduction interpolation function for determining the rheological properties of bile in farm animals to increase the entrepreneurial activity of the agricultural sector	(SJR 0,205; Q 3, Procentile 34 (Economics, Econometrics and Finance: Economics and Econometrics), 32 (Business, Management and Accounting: Business and International Management), 28 (Business, Management and Accounting: Strategy and Management)	Aim of the study: In this work, the density and viscosity of bile extract of cattle are determined experimentally, depending on the evaporation time, its humidity and temperature. These parameters are used to determine the optimal evaporation temperature for long-term storage of bile extract. Methodology: During the experiment, an isothermal process occurs. Methods for interpolating experimental data with splines are considered. A computer program was developed for interpolating the bicubic spline function experimentally obtained values of density and viscosity depending on the time and humidity of the bile extract. Conclusion: The interpolated results of the experiments are presented as graphs of spatial functions using the	Authors: Urishbay C. Chomanov, Nurlan M. Temirbekov, Gul'mira S. Kenenbay, Tamara C. Tultabayeva, Bakhytzhan C. Omirzhanova, Mukhtar C. Tultabayev Title: {Reduction Interpolation Function for Determining the Rheological Properties of Bile in Farm Animals to Increase the Entrepreneurial Activity of the Agricultural Sector} Academy of Entrepreneurship Journal Research Article: 2020 Vol: 26 Issue: 1, pp. 1-8

			SURFER graphical editor. © 2020 Allied Business Academies	
66.	Comparative analysis of parallel algorithms for solving oil recovery problem using cuda and opencl	DOI: 10.22075/IJNAA.2021.4809 (SJR 0,161; Q 4, Procentile 8(Mathematics: Analysis), 6 (Mathematics: Applied Mathematics))	In this paper the implementation of parallel algorithm of alternating direction implicit (ADI) method has been considered. ADI parallel algorithm is used to solve a multiphase multicomponent fluid flow problem in porous media. There are various technologies for implementing parallel algorithms on the CPU and GPU for solving hydrodynamic problems. In this paper GPU-based (graphic processor unit) algorithm was used. To implement the GPU-based parallel ADI method, CUDA and OpenCL were used. ADI is an iterative method used to solve matrix equations. To solve the tridiagonal system of equations in ADI method, the parallel version of cyclic reduction (CR) method was implemented. The cyclic reduction is a method for solving linear equations by repeatedly splitting a problem as a Thomas method. To implement of a sequential algorithm for solving the oil recovery problem, the implicit Thomas method was used. Thomas method or tridiagonal matrix algorithm is used to solve tridiagonal systems of equations. To test parallel algorithms personal computer installed Nvidia RTX 2080 graphic card with 8 GB of video memory was used. The computing results of parallel algorithms using CUDA and OpenCL were compared and analyzed. The main purpose of this	Authors: T. Imankulov, B. Daribayev, S. Mukhambetzhanov Title: {Comparative analysis of parallel algorithms for solving oil recovery problem using cuda and opencl} International Journal of NonLinear Analysis and Applications Том 12, Выпуск 1, Страницы 351 – 364, 2021 DOI: 10.22075/IJNAA.2021.4809

			research work is a comparative analysis of the parallel algorithm computing results on different technologies, in order to show the advantages and disadvantages each of CUDA and OpenCL for solving oil recovery problems. © 2021, Semnan University, Center of Excellence in Nonlinear Analysis and Applications. All rights reserved	
67.	The fictitious domain method for the Navier-Stokes equations in natural variables	DOI:10.1063/5.0040727 (SJR 0,177; Q конференция, Procentile 17 (Physics and Astronomy: General Physics and Astronomy)	In this paper, we consider a variant of the fictitious domain method associated with the modification of nonlinear terms in a fictitious subdomain. The model problem shows the effectiveness of using this modification. The proposed version of the method is used to solve the problem of an arbitrary region and to set a boundary condition for pressure. A numerical solution is implemented and the results of numerical results are given. © 2021 Author(s).	Authors: Zh. Zhaksylykova, N. Temirbekov, Y. A. Malgazhdarov Title: {The fictitious domain method for the Navier-Stokes equations in natural variables} February 2021 AIP Conference Proceedings 2325(1):020041 Conference: Third International Conference on Material Science, Smart Structures and Applications: (ICMSS 2020) DOI:10.1063/5.0040727
68.	Using the conjugate equations method for solving inverse problems of mathematical geophysics and mathematical epidemiology	DOI:10.1063/5.0040264 (SJR 0,177; Q конференция, Procentile 17 (Physics and Astronomy: General Physics and Astronomy)	In this paper, the theory of conjugate equations is used to solve the inverse problem of the continuation of potential fields in the direction of disturbing masses, in the inverse problem of magnetotelluric sounding (MTS), for problems of mathematical epidemiology. © 2021 Author(s).	Authors: N. Temirbekov, L. Temirbekova Title: {Using the conjugate equations method for solving inverse problems of mathematical geophysics and mathematical epidemiology} February 2021 AIP Conference Proceedings 2325(1):020023 Conference: Third International Conference on Material Science, Smart

				Structures and Applications: (ICMSS 2020) DOI:10.1063/5.0040264
69.	Parallel CUDA implementation of a numerical algorithm for solving the Navier-Stokes equations using the pressure uniqueness condition	DOI: 10.1063/5.0041039 (SJR 0,177; Q конференция, Procentile 17 (Physics and Astronomy: General Physics and Astronomy))	In this paper, we study numerical methods for solving the Navier-Stokes equations in doubly connected domains. Two methods for solving the problem are considered. The first method is based on constructing a difference problem in variables of the stream function and the vortex of velocity using the uniqueness condition for pressure. The numerical solution of the elliptic equation for stream functions is found as the sum of the solutions of two simple problems of an elliptic type. One problem is with homogeneous boundary conditions, and the other is with a homogeneous equation. An alternative approach to solving the problem is the fictitious domain method with the continuation of the least coefficient. This method does not require satisfying the pressure uniqueness condition, and is simple to implement. An important direction in the development of numerical simulation methods is the study of approximate methods for solving problems of mathematical physics in complex multidimensional areas. To solve many applied problems in irregular areas, the fictitious domain method is widely used, which is characterized by a high degree of automation of programming. The main idea of the fictitious domain method is that the problem is solved not in the original complex	Authors: Almas Temirbekov, Dossan Baigereyev, S. Amanzholov, Nurlan Temirbekov, Baidaulet Urmashiev Aidana Amantayeva Title: {Parallel CUDA implementation of a numerical algorithm for solving the Navier-Stokes equations using the pressure uniqueness condition} February 2021 AIP Conference Proceedings 2325(1):020063 Conference: Third International Conference on Material Science, Smart Structures and Applications: (ICMSS 2020) DOI:10.1063/5.0041039

			<p>domain, but in some other, simpler domain. This allows to create software immediately for a fairly wide class of problems with arbitrary computational domains. The possibilities of applying the fictitious domain method to the problems of hydrodynamics in the variables "stream function, vortex of velocity" are considered in many works. In this paper, we study a numerical method for solving the Navier-Stokes equations in doubly connected domains. A computational finite difference algorithm for solving an auxiliary problem of the fictitious domain method has been developed. The results of numerical modeling of the two-dimensional Navier-Stokes equations by the fictitious domain method with continuation by the lowest coefficient are presented. For this problem, a parallel algorithm was developed using the CUDA architecture, which was tested on various grid dimensions. © 2021 Author(s)</p>	
70.	<p>Kinematic synthesis and analysis of the robomech class parallel manipulator with two grippers</p>	<p>DOI:10.3390/robotics10030099 (SJR 0,390; Q 2, Procentile 70 (Mathematics: Control and Optimization), 67 (Engineering: Mechanical Engineering), 53 (Computer Science: Artificial Intelligence))</p>	<p>In this paper, methods of kinematic synthesis and analysis of the RoboMech class parallel manipulator (PM) with two grippers (end effectors) are presented. This PM is formed by connecting two output objects (grippers) with a base using two passive and one negative closing kinematic chains (CKCs). A PM with two end effectors can be used for reloading operations of stamped products between two adjacent main technologies in a cold stamping line. Passive CKCs represent</p>	<p>Authors: Zhumadil Baigunchekov, med amine Laribi, Azamat Mustafa Title: {Kinematic Synthesis and Analysis of the RoboMech Class Parallel Manipulator with Two Grippers} August 2021 Robotics 10(3):99 DOI:10.3390/robotics10030099</p>

			<p>two serial manipulators with two degrees of freedom, and negative CKC is a three-joined link with three negative degrees of freedom. A negative CKC imposes three geometric constraints on the movements of the two output objects. Geometric parameters of the negative CKC are determined on the basis of the problems of the Chebyshev and least-square approximations. Problems of positions and analogues of velocities and accelerations of the PM with two end effectors have been solved. © 2021 by the authors. Licensee MDPI, Basel, Switzerland</p>	
71.	<p>Drying of Vegetable Products in Mobile Solar Dryer with Movable Shelving</p>	<p>DOI: 10.1134/s1810232821010112 (SJR 0,390; Q 2, Procentile 50 (Energy: Energy Engineering and Power Technology), 49 (Mathematics: Modeling and Simulation), 48 (Environmental Science: Environmental Engineering))</p>	<p>Abstract: The article outlines the relevance of production of dried products using a mobile solar dryer plant with mobile shelving. For intensification of the drying process, the convection of the drying agent flow in the proposed design of drying chamber was studied via numerical solution of the Navier–Stokes equations. As a result, a graphical interpretation of isolines of moving stream of drying agent in a chamber was obtained. Varying dimensionless parameters of the drying agent enabled complete coverage of all zones of the dryer chamber. The motion of shelves due to gravitational forces allowed uniform drying of materials. Through multivariate experiments, the influence of the temperature-time regimes of the dryer chamber on the particle size was investigated. The optimal drying conditions for cut fruit</p>	<p>Authors: B.A. Urmashev, K.M. Khazimov, A.N. Temirbekov, A.T. Tursynbay, T.V. Torzhenova, M.Zh. Khazimov Title: {Drying of Vegetable Products in Mobile Solar Dryer with Movable Shelving} Journal of Engineering Thermophysics Том 30, Выпуск 1, Страницы 145 - 162 (IF1.402), Pub Date : 2021-06-18, DOI: 10.1134/s1810232821010112</p>

			are presented. © 2021, Pleiades Publishing, Ltd	
72.	An abstract theorem on completeness of systems of root vectors of correct restrictions	DOI: 10.1007/s43036-021-00137-2 (SJR 0,401; Q 3, Procentile "46 (Mathematics: Algebra and Number Theory), 35 (Mathematics: Analysis)"	The aim of this work is to prove an abstract theorem on completeness of systems of root vectors of correct restrictions with interesting applications for differential operators. Moreover, this result gives a whole class of non-self-adjoint correct restrictions of maximal operator which possesses a complete system of root vectors in a Hilbert space. © 2021, Tusi Mathematical Research Group (TMRG)	Authors: Tulenov K. S., Zhumanova L. K. Title: {An abstract theorem on completeness of systems of root vectors of correct restrictions} Advances in Operator Theory Том 6, Выпуск 2 April 2021 Номер статьи 36 DOI: 10.1007/s43036-021-00137-2
73.	Mixed Lagrangian-Eulerian Simulation of Interaction between a Shockwave and a Cloud of Water Droplets	DOI: 10.1134/S1810232820020071 (SJR 0.457; Q3; Procentile 50 (Energy Engineering and Power Technology), 49 (Modeling and Simulation), 48 (Environmental Engineering), 41 (Condensed Matter Physics))	Abstract: We present a numerical model suitable for simulation of shock orblast waves passing through a cloud of water droplets. The model takes into account the droplet breakup, radiation, and evaporation effects. The gas phase (a mixture of air and water vapor) is solved within an Eulerian framework with a set of compressible transport equations. The disperse phase (water droplets) is represented by a number of Lagrangian parcels of a specified size and mass distribution. The model has been verified with experimental data. The results show that for large (millimeter-sized) droplets with high Weber numbers, the breakup model is the most important part for accurate representation of the wave-droplet interaction phenomena, while for very fine droplets (1 μm or less), the evaporation effects are the strongest in the shock wave mitigation process. The radiative heat flux increase due to high droplet emissivity is found to be possible for an intermediate size water droplets (about 10–20 μm) in the case of	@article{article, author = {Hrebtov, Michael and Bobrov, M. and Zhakebayev, Dauren and Karzhaubayev, K. }, year = {2020}, month = {04}, pages = {254-263}, title = {Mixed Lagrangian-Eulerian Simulation of Interaction between a Shockwave and a Cloud of Water Droplets}, volume = {29}, journal = {Journal of Engineering Thermophysics}, doi = {10.1134/S1810232820020071 } }

			continuous heat release. © 2020, Pleiades Publishing, Ltd.	
74.	Laminar to turbulent flow transition inside the boundary layer adjacent to isothermal wall of natural convection flow in a cubical cavity	DOI: 10.1016/j.ijheatmasstransfer.2020.120822 (SJR 1.713; Q1; Procentile 98 (Fluid Flow and Transfer Processes) 95(Mechanical Engineering) 94(Condensed Matter Physics))	We investigate three-dimensional natural convection flow in an air-filled, differentially heated cubical cavity. The vertical wall on the left is heated and the vertical wall on the right is cooled, with the remaining four walls being adiabatic. We performed direct numerical simulations of the natural convection flow using discrete unified gas-kinetic scheme (DUGKS), with an improved implementation of boundary conditions. Thin boundary layers are developed along the two isothermal walls. The laminar to turbulent flow transition inside the boundary layers is studied in this paper. The simulations are conducted at three Rayleigh numbers of 1.5×10^9 , 1.0×10^{10} , 1.0×10^{11} using nonuniform grids with resolution up to 320^3 . The Prandtl number is fixed at 0.71. We provide a detailed analysis of the transition from laminar to turbulent flow inside the vertical boundary layers and its influence on the rate of heat transfer. Time traces of temperature and velocity, time-averaged flow field, statistics of fluctuation fields are presented to illustrate distinct behaviors in the laminar and turbulent thermal boundary layer, as well as to determine the transition location at different Ra numbers. The average Nusselt numbers for different Ra numbers are compiled and compared to previous results. A guideline of the resolution requirement is suggested based on the Ra scaling of laminar thermal boundary layer. © 2020 Elsevier Ltd	@article{article, author = {Wen, Xin and Wang, Lian-Ping and Guo, Zhaoli and Zhakebayev, Dauren}, year = {2021}, month = {03}, pages = {120822}, title = {Laminar to turbulent flow transition inside the boundary layer adjacent to isothermal wall of natural convection flow in a cubical cavity}, volume = {167}, journal = {International Journal of Heat and Mass Transfer}, doi = {10.1016/j.ijheatmasstransfer.2020.120822} }

75.	On the dynamics of drilling	DOI: 10.1016/j.ijengsci.2019.103184 (SJR 2.731; Q1; Procentile 99 (General Engineering) 97 (Mechanical Engineering) 96 (Mechanics of Materials) 92 (General Materials Science)	A multi-parameter approach for analysing drilling dynamics is developed. It is oriented to better understanding peculiarities of the process and optimising existing formulations. The procedure is specified for bending vibrations of a rotating elastic beam pre-stressed simultaneously by an axial compressive force and torque. The appropriately normalized ratio of the bending stiffness to the axial force magnitude is assumed to be small. Two other independent dimensionless parameters correspond to the vibration frequency and the relation between force and torque magnitudes. A classification, similar to that in thin shell theory, is established for free bending vibrations. The associated shortened equations are derived. The asymptotic results are validated by comparison with the dispersion curves calculated from the original full equation of motion. An example of a boundary-value problem for a drill string of a finite length is also presented. © 2019	<pre>@article{ article, author = {Kaplunov, J. and Khajiyeva, Lelya and Martyniuk, M. and Sergaliyev, A.S.}, year = {2020}, month = {01}, pages = {103184}, title = {On the dynamics of drilling}, volume = {146}, journal = {International Journal of Engineering Science}, doi = {10.1016/j.ijengsci.2019.103184} }</pre>
76.	Development of an information system for storing digitized works of the Almaty Academgorodok research institutes	DOI: 10.47086/pims.613534 (SJR 0.190; Q3; Procentile 43 (General Engineering))	The present article describes the architecture of the integrated distributed information system created for storing digitized works of employees of Almaty Akademgorodok research institutes (Kazakhstan) and providing access to them using Web technology. Comparative analysis of two data storage systems for storing digitized works, Ceph and GlusterFS, is provided. The description of the software part of the information system is provided which consists of four subsystems: repository of digital objects, subsystem for managing current research information, subsystem of integration of distributed information resources, subsystem of access to distributed information resources based	<pre>@article{ article, author = {TEMİRBEKOV, Nurlan and Baigereyev, Dossan and TEMİRBEKOV, Almas and OMİRZHANOVA, Bakytzhan}, year = {2021}, month = {07}, pages = {}, title = {Development of an Information System for Storing Digitized Works of the Almaty Academgorodok Research Institutes}, journal = {Proceedings of International Mathematical Sciences},</pre>

			<p>on Web technologies. The relation between the subsystems and their integration is described. The work defines the requirements to the repository of digital objects. The requirements for the repository of digital objects are defined; a comparative analysis of open source software used for these purposes is made. © 2019 Author(s).</p>	<pre>doi = {10.47086/pims.613534} }</pre>
77.	<p>Parallel CUDA implementation of a numerical algorithm for solving the Navier-Stokes equations using the pressure uniqueness condition</p>	<p>DOI: 10.1063/5.0041039 (SJR 0.177; Q4; Procentile 17 (General Physics and Astronomy))</p>	<p>In this paper, we study numerical methods for solving the Navier-Stokes equations in doubly connected domains. Two methods for solving the problem are considered. The first method is based on constructing a difference problem in variables of the stream function and the vortex of velocity using the uniqueness condition for pressure. The numerical solution of the elliptic equation for stream functions is found as the sum of the solutions of two simple problems of an elliptic type. One problem is with homogeneous boundary conditions, and the other is with a homogeneous equation. An alternative approach to solving the problem is the fictitious domain method with the continuation of the least coefficient. This method does not require satisfying the pressure uniqueness condition, and is simple to implement. An important direction in the development of numerical simulation methods is the study of approximate methods for solving problems of mathematical physics in complex multidimensional areas. To solve many applied problems in irregular areas, the fictitious domain method is widely used, which is characterized by a high degree of automation of programming. The main idea of the fictitious domain method is that the problem is solved not in the original</p>	<pre>@inproceedings{inproceedings, author = {Temirbekov, Almas and Baigereyev, Dossan and Temirbekov, Nurlan and Urmashhev, Baidaulet and Amantayeva, Aidana}, year = {2021}, month = {02}, pages = {020063}, title = {Parallel CUDA implementation of a numerical algorithm for solving the Navier-Stokes equations using the pressure uniqueness condition}, volume = {2325}, journal = {AIP Conference Proceedings}, doi = {10.1063/5.0041039} }</pre>

			<p>complex domain, but in some other, simpler domain. This allows to create software immediately for a fairly wide class of problems with arbitrary computational domains. The possibilities of applying the fictitious domain method to the problems of hydrodynamics in the variables "stream function, vortex of velocity" are considered in many works. In this paper, we study a numerical method for solving the Navier-Stokes equations in doubly connected domains. A computational finite difference algorithm for solving an auxiliary problem of the fictitious domain method has been developed. The results of numerical modeling of the two-dimensional Navier-Stokes equations by the fictitious domain method with continuation by the lowest coefficient are presented. For this problem, a parallel algorithm was developed using the CUDA architecture, which was tested on various grid dimensions. © 2021 Author(s).</p>	
78.	<p>Near-Resonant Regimes of a Moving Load on a Pre-Stressed Incompressible Elastic Half-Space</p>	<p>DOI: 10.2478/ama-2021-0005 (SJR 0.314; Q3; Procentile 45 (Mechanical Engineering) 41 (Control and Systems Engineering)</p>	<p>The article is concerned with the analysis of the problem for a concentrated line load moving at a constant speed along the surface of a pre-stressed, incompressible, isotropic elastic half-space, within the framework of the plane-strain assumption. The focus is on the near-critical regimes, when the speed of the load is close to that of the surface wave. Both steady-state and transient regimes are considered.</p> <p>Implementation of the hyperbolic-elliptic asymptotic formulation for the surface wave field allows explicit approximate solution for displacement components expressed in terms of the elementary functions, highlighting the resonant nature of the surface wave. Numerical</p>	<pre>@article{article, author = {Kudaibergenov, Askar and Kudaibergenov, Askat and Prikazchikov, D.}, year = {2021}, month = {03}, pages = {30-36}, title = {Near-Resonant Regimes of a Moving Load on a Pre-Stressed Incompressible Elastic Half-Space}, volume = {15}, journal = {Acta Mechanica et Automatica}, doi = {10.2478/ama-2021-0005} }</pre>

			illustrations of the solutions are presented for several material models.	
79.	Differential evolution algorithm of solving an inverse problem for the spatial Solow mathematical model	DOI: 10.1515/jiip-2020-0108 (SJR 0.498; Q3; Procentile 54 (Applied Mathematics))	The differential evolution algorithm is applied to solve the optimization problem to reconstruct the production function (inverse problem) for the spatial Solow mathematical model using additional measurements of the gross domestic product for the fixed points. Since the inverse problem is ill-posed the regularized differential evolution is applied. For getting the optimized solution of the inverse problem the differential evolution algorithm is paralleled to 32 kernels. Numerical results for different technological levels and errors in measured data are presented and discussed. © 2020 Walter de Gruyter GmbH, Berlin/Boston 2020.	@article{article, author = {Kabanikhin, S. and Krivorotko, Olga and Bektemessov, Zh and Bektemesov, Maktagali and Zhang, Shuhua}, year = {2020}, month = {11}, pages = {761-774}, title = {Differential evolution algorithm of solving an inverse problem for the spatial Solow mathematical model}, volume = {28}, journal = {Journal of Inverse and Ill-posed Problems}, doi = {10.1515/jiip-2020-0108}}
80.	Numerical Solution of the Inverse Pharmacokinetic Problem for the Three-Compartment Model	DOI:10.51301/vest.su.2020.v138.i2.136 (SJR 0.19; Q3; Procentile 43 (Engineering: General Engineering))	This article considers the numerical solution of the inverse pharmacokinetics problem for a three-compartment linear model. First, the article presents some reviews of the pharmacokinetics problem and the three-compartment model. The following describes the formulation of the pharmacokinetics problem for a three-compartment linear model. The direct problem is the Cauchy problem for systems of ordinary differential equations. Solving the direct problem analytically, we find the concentration for the first compartment, since it is the object of the study. The formulation of the inverse problem is reduced to a nonlinear operator equation. For the inverse problem, seven coefficients concentration for the first compartment should be found for some	@article{article, author = {Urmashhev, B.A. and Kasenov, S.Y. and Tursynbay, A.T and Temirbekov, A.N. and Amantayeva, A.B. and Sagimbayeva, L.A.}, year = {2020}, month = {01}, pages = {772-779}, title = {Solutions of the inverse problem of pharmacokinetics for the three-compartment model}, volume = {138}, journal = {Vestnik KazNRTU}, doi = {10.51301/vest.su.2020.v138.i2.136}}

			<p>additional information of a given concentration. The inverse problem is reduced to minimizing the objective functional. For the numerical solution, an adaptive search method is used genetic algorithm. The numerical results of this problem are given. © 2020. School of Science, IHU. All rights reserved.</p>	<p>}</p>
81.	<p>Numerical Solution of the Inverse Pharmacokinetic Problem for the Three-Compartment Model</p>	<p>DOI: 10.51301/vest.su.2020.v138.i2.136 (SJR 0.19; Q4; Procentile 43 (Engineering: General Engineering))</p>	<p>This article considers the numerical solution of the inverse pharmacokinetics problem for a three-compartment linear model. First, the article presents some reviews of the pharmacokinetics problem and the three-compartment model. The following describes the formulation of the pharmacokinetics problem for a three-compartment linear model. The direct problem is the Cauchy problem for systems of ordinary differential equations. Solving the direct problem analytically, we find the concentration for the first compartment, since it is the object of the study. The formulation of the inverse problem is reduced to a nonlinear operator equation. For the inverse problem, seven coefficients concentration for the first compartment should be found for some additional information of a given concentration. The inverse problem is reduced to minimizing the objective functional. For the numerical solution, an adaptive search method is used genetic algorithm. The numerical results of this problem are given. © 2020 School of Science, IHU. All Rights Reserved.</p>	<p>@article{ article, author = {Urmashev, B.A. and Kasenov, S.Y. and Tursynbay, A.T and Temirbekov, A.N. and Amantayeva, A.B. and Sagimbayeva, L.A.}, year = {2020}, month = {01}, pages = {772-779}, title = {Solutions of the inverse problem of pharmacokinetics for the three-compartment model}, volume = {138}, journal = {Vestnik KazNRTU}, doi = {10.51301/vest.su.2020.v138.i2.136} }</p>
82.	<p>Determination of the main parameters of the photovoltaic solar module</p>	<p>DOI: 10.12720/sgce.9.1.162-169 (SJR 0.203; Q4; Procentile 25 (Energy: General: Energy), 20 (Environmental Science: General Environmental Science),</p>	<p>This article deals with the determination of the main operating parameters of a photovoltaic solar module. In laboratory tests, the study of the dependence of current, voltage and power on time and density of solar radiation, as well as</p>	<p>@article{ article, author = {Urmashev, Baydaulet and Kunelbayev, Murat and Temirbekov, Almas and Kassenov, Syrym and</p>

		19 (Earth and Planetary Sciences: General Earth and Planetary Sciences)	<p>monitoring of environmental parameters: temperature and humidity of the outside air.</p> <p>Analysis of the test results shows that a photoelectric module with an installed capacity of 800 W and a total battery capacity of 800 Ah provides the electric power industry with a daily consumption of 2.0.. 2.2 kWh. The discharge time of the battery varies from 11.7 to 3.5 hours when the average electric load of the consumer changes from 300 to 1000 watts. © 2020 The Authors, published by EDP Sciences.</p>	<p>Zhaksylykova, Zhadra and Amenova, Farida}, year = {2020}, month = {01}, pages = {162-169}, title = {Determination of the main parameters of the photovoltaic solar module}, journal = {International Journal of Smart Grid and Clean Energy}, doi = {10.12720/sgce.9.1.162-169}</p>
83.	On Fredholm solvability and on the index of the generalized Neumann problem for an elliptic equation	DOI:10.1080/17476933.2021.1958797	<p>In this paper, we investigate the Fredholm solvability of the generalized Neumann problem for a high-order elliptic equation in the plane. The equivalence of the solvability conditions of the generalized Neumann problem to the complementarity condition (Shapiro–Lopatinsky condition) is proved. The formula for the index of the specified problem in the class (Formula presented.) is calculated. © 2021 Informa UK Limited, trading as Taylor & Francis Group.</p>	<p>Koshanov B., Soldatov A. . On Fredholm solvability and on the index of the generalized Neumann problem for an elliptic equation // Complex Variables and Elliptic Equations. – 2021. - P. 1-17.</p>
84.	A numerical simulation of air flow in the human respiratory system for various environmental conditions	DOI: 10.1186/s12976-020-00133-8	<p>The functions of the nasal cavity are very important for maintaining the internal environment of the lungs since the inner walls of the nasal cavity control the temperature and saturation of the inhaled air with water vapor until the nasopharynx is reached. In this paper, three-dimensional computational studies of airflow transport in the models of the nasal cavity were carried out for the usual inspiratory velocity in</p>	<p>Issakhov A., Zhandaulet Y., Issakhov A., Abylkassymova A. . A numerical simulation of air flow in the human respiratory system for various environmental conditions // Theoretical Biology and Medical Modelling. - 2021. - Vol.18. DOI: 10.1186/s12976-020-00133-8</p>

			<p>various environmental conditions. Three-dimensional numerical results are compared with experimental data and calculations of other authors. Numerical results show that during normal breathing, the human nose copes with heat and relative moisture metabolism in order to balance the intra-alveolar conditions. It is also shown in this paper that a normal nose can maintain balance even in extreme conditions, for example, in cold and hot weather. The nasal cavity accelerates heat transfer by narrowing the air passages and swirls from the nasal concha walls of the inner cavity. © 2020, The Author(s).</p>	
85.	<p>Solvability issues of a pseudo-parabolic fractional order equation with a nonlinear boundary condition</p>	<p>DOI: 10.3390/fractalfract5040134</p>	<p>This paper is devoted to the fundamental problem of investigating the solvability of initial-boundary value problems for a quasi-linear pseudo-parabolic equation of fractional order with a sufficiently smooth boundary. The difference between the studied problems is that the boundary conditions are set in the form of a nonlinear boundary condition with a fractional differentiation operator. The main result of this work is establishing the local or global solvability of stated problems, depending on the parameters of the equation. The Galerkin method is used to prove the existence of a quasi-linear pseudo-parabolic equation's weak solution in a bounded domain. Using Sobolev embedding theorems, a priori estimates of the solution</p>	<p>Aitzhanov S.E., Berdyshev A.S., Bekenayeva K.S. Solvability issues of a pseudo-parabolic fractional order equation with a nonlinear boundary condition // Fractal and Fractional. - 2021. - Vol.5. DOI: 10.3390/fractalfract5040134</p>

			<p>are obtained. A priori estimates and the Rellich–Kondrashov theorem are used to prove the existence of the desired solutions to the considered boundary value problems. The uniqueness of the weak generalized solutions of the initial boundary value problems is proved on the basis of the obtained a priori estimates and the application of the generalized Gronwall lemma. The need to consider and study such initial boundary value problems for a quasi-linear pseudo-parabolic equation follows from practical requirements, such as solving fractional differential equations that simulate physical processes that occur during the study of liquid filtration processes, etc. © 2021 by the authors. Licensee MDPI, Basel, Switzerland.</p>	
86.	<p>Van der Corput lemmas for Mittag-Leffler functions. II. α-directions</p>	<p>DOI 10.1016/j.bulsci.2021.103016</p>	<p>The paper is devoted to study analogues of the van der Corput lemmas involving Mittag-Leffler functions. The generalisation is that we replace the exponential function with the Mittag-Leffler-type function, to study oscillatory integrals appearing in the analysis of time-fractional partial differential equations. More specifically, we study integral of the form $I_{\alpha,\beta}(\lambda) = \int_{\mathbb{R}} E_{\alpha,\beta}(i\alpha\lambda\phi(x))\psi(x)dx$, for the range $0 < \alpha < 1$. This extends the variety of estimates obtained in the first part, where integrals with functions $E_{\alpha,\beta}(i\lambda\phi(x))$ have been studied. Several generalisations of the van der Corput lemmas are proved. As an</p>	<p>Ruzhansky M., Torebek B.T. . Van der Corput lemmas for Mittag-Leffler functions. II. α-directions // Bulletin des Sciences Mathematiques. – 2021. - Vol.171.</p>

			application of the above results, the generalised Riemann-Lebesgue lemma, the Cauchy problem for the time-fractional Klein-Gordon and time-fractional Schrödinger equations are considered. © 2021 The Authors	
87.	On a model of the generation of turbulence	DOI: 10.1016/j.chaos.2021.111099	In this article, the nonlinear term of the Navier-Stokes equation is approximated to nonlinear convolutional expressions. At low values of viscosity, their values are close if the carrier of the convolution is of the same order of magnitude as the value of viscosity. It is expected that the dynamics of the thus obtained modified Navier-Stokes equation preserves the physical phenomena described by the Navier-Stokes equation. The dynamics of the modified Navier-Stokes equation is investigated in this work. © 2021 Elsevier Ltd	Kanguzhin B.E. . On a model of the generation of turbulence // Chaos, Solitons and Fractals. – 2021. - Vol.150. DOI: 10.1016/j.chaos.2021.111099
88.	An inverse problem for generalized Kelvin-Voigt equation with p-Laplacian and damping term	DOI 10.1088/1361-6420/ac1362	In this paper, we consider the nonlinear inverse problem for generalized Kelvin-Voigt equations with the p-Laplace diffusion and damping term, describing the motion of incompressible viscous fluids. We assume that the damping term in the momentum equation depends on whether its signal is positive or negative, which may realizes the presence of a source or a sink within the system. The investigated inverse problem consists of finding a coefficient $f(t)$ of the right-hand side of the momentum equation, a vector of velocity field v , and a pressure π . An additional information on a solution of	Antontsev S.N., Khompysh K. . An inverse problem for generalized Kelvin-Voigt equation with p-Laplacian and damping term // Inverse Problems. – 2021. - Vol.37. DOI 10.1088/1361-6420/ac1362

			the inverse problem is given as integral overdetermination condition. Under several assumptions on the exponents p, m , the coefficients μ, κ, γ , the dimension of the space d , and specified initial data, we prove the existence and uniqueness of the weak solution of the problem. © 2021 IOP Publishing Ltd.	
89.	Identification of the domain of the sturm–liouville operator on a star graph	DOI 10.3390/sym13071210	This article is devoted to the unique recovering of the domain of the Sturm–Liouville operator on a star graph. The domain of the Sturm–Liouville operator is uniquely identified from the set of spectra of a finite number of specially selected canonical problems. In the general case, the domain of the definition of the original operator can be specified by integro-differential linear forms. In the case when the domain of the Sturm–Liouville operator on a star graph corresponds to the boundary value problem, it is sufficient to choose only finite parts of the spectra of canonical problems for a unique identification of the boundary form. Moreover, the above statement is valid only for a symmetric star graph. © 2021 by the authors.	Kanguzhin B., Aimal Rasa G.H., Kaiyrbek Z. . Identification of the domain of the sturm–liouville operator on a star graph // Symmetry. – 2021. - Vol.13. DOI 10.3390/sym13071210
90.	On the localization of the spectrum of some perturbations of a two-dimensional	DOI:10.1080/17476933.2021.1885386	In this paper, we study the localization of the discrete spectrum of certain perturbations of a two-dimensional harmonic oscillator. The convergence of the expansion of the source function in terms of the eigenfunctions of a two-dimensional harmonic oscillator is investigated. A	Kanguzhin B.E., Fazullin Z. . On the localization of the spectrum of some perturbations of a two-dimensional harmonic oscillator // Journal of Mathematical Sciences (United States). – 2021. . - Vol.66. – P. 1194 - 1208. DOI:10.1080/17476933.2021.1885386

	harmonic oscillator		representation of Green's function of a two-dimensional harmonic oscillator is obtained. The singularities of Green's function are highlighted. The well-posed definition of the maximal operator generated by a two-dimensional harmonic oscillator on a specially extended domain of definition is given. Then, we describe everywhere solvable invertible restrictions of the maximal operator. We establish that the eigenvalues of a harmonic oscillator will also be the eigenvalues of well-posed restrictions. The results are supported by illustrative examples. © 2021 Informa UK Limited, trading as Taylor & Francis Group.	
91.	Operators Whose Resolvents Have Convolution Representations and their Spectral Analysis	DOI 10.1007/s10958-020-05167-4	In this paper, we study spectral decompositions with respect to a system of generalized eigenvectors of second-order differential operators on an interval whose resolvents possess convolution representations. We obtain the convolution representation of resolvents of second-order differential operators on an interval with integral boundary conditions. Then, using the convolution generated by the initial differential operator, we construct the Fourier transform. A connection between the convolution operation in the original functional space and the multiplication operation in the space of Fourier transforms is established. Finally, the problem on the convergence of spectral expansions generated by the original differential	Kanguzhin B.E.. Operators Whose Resolvents Have Convolution Representations and their Spectral Analysis // Journal of Mathematical Sciences (United States). – 2021. . - Vol.252. – P. 384 - 398. DOI: 10.1007/s10958-020-05167-4

			operator is studied. Examples of convolutions generated by operators are also presented. © 2021, Springer Science+Business Media, LLC, part of Springer Nature.	
92.	Identification of mathematical model of bacteria population under the antibiotic influence	DOI 10.1515/jiip-2017-0102	This work is devoted to the identification of a mathematical model of bacteria population under the antibiotic influence, based on the solution of the corresponding inverse problems. These problems are solved by the gradient method, genetic algorithm and Nelder-Mead method. Calculations are made using model and real data. © 2020 De Gruyter.	Serovajsky S., Nurseitov D., Kabanikhin S., Azimov A., Ilin A., Islamov R.. Identification of mathematical model of bacteria population under the antibiotic influence // Journal of Inverse and Ill-Posed Problems. – 2021. - Vol.26. – P. 384 - 398. DOI: 10.1515/jiip-2017-0102.
93.	On One Algorithm To Find a Solution to a Linear Two-Point Boundary Value Problem	DOI 10.1134/S1995080221030173	Abstract: A two-parameter family of algorithms for finding an approximate solution to a linear two-point boundary value problem for a system of ordinary differential equations is offered. The convergence conditions for the algorithms are obtained. The necessary and sufficient coefficient conditions for the well-posedness of considered problem are established. © 2021, Pleiades Publishing, Ltd.	Temesheva S.M., Dzhumabaev D.S, Kabdrakhova S.S. . On One Algorithm To Find a Solution to a Linear Two-Point Boundary Value Problem // Lobachevskii Journal of Mathematics. – 2021. - Vol.42. – P. 606 - 612. DOI: 10.1134/S1995080221030173.
94.	The classical Kelvin-Voigt problem for incompressible fluids with unknown non-constant density: Existence,	DOI 10.1088/1361-6544/abe51e	The classical Kelvin-Voigt equations for incompressible fluids with non-constant density are investigated in this work. To the associated initial-value problem endowed with zero Dirichlet conditions on the assumed Lipschitz-continuous boundary, we prove the existence of weak solutions: velocity and density. We also prove the	Antontsev S.N., De Oliveira H.B., Khompysh K. . The classical Kelvin-Voigt problem for incompressible fluids with unknown non-constant density: Existence, uniqueness and regularity // Nonlinearity. – 2021. - Vol.34. – P. 3083 – 3111. DOI: 10.1088/1361-6544/abe51e.

	uniqueness and regularity		existence of a unique pressure. These results are valid for $d \in \{2, 3, 4\}$. In particular, if $d \in \{2, 3\}$, the regularity of the velocity and density is improved so that their uniqueness can be shown. In particular, the dependence of the regularity of the solutions on the smoothness of the given data of the problem is established. © 2021 IOP Publishing Ltd & London Mathematical Society.	
95.	Kelvin-Voigt equations with anisotropic diffusion, relaxation and damping: Blow-up and large time behavior	DOI 10.3233/ASY-201597	A nonlinear initial and boundary-value problem for the Kelvin-Voigt equations with anisotropic diffusion, relaxation and absorption/damping terms is considered in this work. The global and local unique solvability of the problem was established in (J. Math. Anal. Appl. 473(2) (2019) 1122-1154). In the present work, we show how all the anisotropic exponents of nonlinearity and all anisotropic coefficients should interact with the problem data for the solutions of this problem display exponential and polynomial time-decays. We also establish the conditions for the solutions of this problem to blow-up in a finite time in three different cases: problem without convection, full anisotropic problem, and the problem with isotropic relaxation. © 2021 - IOS Press. All rights reserved.	Antontsev S.N., De Oliveira H.B., Khompysh K. . Kelvin-Voigt equations with anisotropic diffusion, relaxation and damping: Blow-up and large time behavior // Asymptotic Analysis. – 2021. - Vol.121. – P. 125 - 157. DOI: 10.3233/ASY-201597
96.	Punctual Dimension of Algebraic	DOI: 10.1134/S1995080221040089	A nonlinear initial and boundary-value problem for the Kelvin-Voigt equations with anisotropic diffusion, relaxation and absorption/damping terms is considered in	Dorzheva, M.V., Issakhov, A.A., Kalmurzayev, B.S., Kornev, R.A., Kotov, M.V. . Punctual Dimension of Algebraic Structures in Certain Classes

	Structures in Certain Classes		this work. The global and local unique solvability of the problem was established in (J. Math. Anal. Appl. 473(2) (2019) 1122-1154). In the present work, we show how all the anisotropic exponents of nonlinearity and all anisotropic coefficients should interact with the problem data for the solutions of this problem display exponential and polynomial time-decays. We also establish the conditions for the solutions of this problem to blow-up in a finite time in three different cases: problem without convection, full anisotropic problem, and the problem with isotropic relaxation. © 2021 - IOS Press. All rights reserved.	// Lobachevskii Journal of Mathematics. – 2021. - Vol. 42. – P. 716 - 725. DOI: 10.1134/S1995080221040089
97.	Non-commutative analogues of weak compactness criteria in symmetric spaces	DOI 10.1007/s43036-021-00129-2	The aim of this work is to study M. Nowak's and K. M. Chong's weak compactness criteria in non-commutative Orlicz spaces. In addition, we obtain a non-commutative analogue of Pełczyński's property (V) in Orlicz spaces of τ -measurable operators. We also obtain Kolmogorov's compactness criterion in terms of conditional expectations in non-commutative symmetric spaces. © 2021, This is a U.S. government work and not under copyright protection in the U.S.; foreign copyright protection may apply.	Nessipbayev Y., Sukochev F., Tulenov K. . Non-commutative analogues of weak compactness criteria in symmetric spaces // Advances in Operator Theory. – 2021. - Vol. 6. DOI: 10.1007/s43036-021-00129-2
98.	The boundedness of the Hilbert transformation from one	DOI 10.1016/j.bulsci.2020.102943	In this paper, we study the boundedness of the Hilbert transformation in Lorentz function spaces, thereby complementing classical results of Boyd. We also characterize the optimal range of a triangular	Zanin D., Sukochev F., Tulenov K. . The boundedness of the Hilbert transformation from one rearrangement invariant Banach space into another and applications // Bulletin des

	rearrangement invariant Banach space into another and applications		truncation operator in Schatten-Lorentz ideals. These results further entail sharp commutator estimates and applications to operator Lipschitz functions in Schatten-Lorentz ideals. © 2020 Elsevier Masson SAS	Sciences Mathematiques. – 2021. - Vol. 167. DOI: 10.1016/j.bulsci.2020.102943
99.	OPTIMAL REARRANGEMENT-INVARIANT BANACH FUNCTION RANGE FOR THE HILBERT TRANSFORM	DOI 10.32523/2077-9879-2021-12-2-90-103	We describe the optimal rearrangement-invariant Banach function range of the classical Hilbert transform acting on a rearrangement-invariant Banach function space. We also show the existence of such optimal range for the Lorentz and Marcinkiewicz spaces. © 2021. The L.N. Gumilyov Eurasian National University.	Tulenov K. . OPTIMAL REARRANGEMENT-INVARIANT BANACH FUNCTION RANGE FOR THE HILBERT TRANSFORM // Eurasian Mathematical Journal. – 2021. - Vol. 12. – P. 01 – 23. DOI: 10.32523/2077-9879-2021-12-2-90-103
100.	Asymptotic behavior of the solution of a singularly perturbed general boundary value problem with boundary jumps	DOI 10.1002/num.22719	It is known that the study of boundary value and mixed problems for integrable linear equations encounters significant difficulties of a fundamental nature. Exceptions are problems with boundary conditions of a special type, which are often called integrable or linearizable. The purpose of this article is to study the asymptotic behaviors of solutions of singularly perturbed general boundary value problems with boundary jumps for higher-order equations. Using the Schlesinger–Birghof theorem, we constructed a fundamental system of solutions of a homogeneous perturbed equation of conditionally stable type in the critical case. Initial boundary functions are constructed based on the fundamental system of solutions. An	Nurgabyl D.N., Uaissov A.B. . Asymptotic behavior of the solution of a singularly perturbed general boundary value problem with boundary jumps // Numerical Methods for Partial Differential Equations. – 2021. - Vol. 37. – P. 2375 - 2392. DOI: 10.1002/num.22719.

			analytical representation is found, the existence and uniqueness of a solution to this boundary value problem are proved. Asymptotic estimates of the solution and its derivatives are derived from the analytical representation of the solution of the given boundary value problem. The limit passage of solution of the perturbed problem to the solution of the unperturbed problem is proved. The conditions of the existence of jumps are found. The values of boundary jumps are determined. As a result, a class of boundary value problems is highlighted that has possessing of phenomenon of boundary jumps. © 2020 Wiley Periodicals LLC	
101.	Integral Representations of Vector Functions Based on the Parametrix of First-Order Elliptic Systems	DOI 10.1134/S0965542521030143	Abstract: Generalized integrals are introduced with kernels depending on the difference of the arguments taken over a domain and a smooth contour, the boundary of this domain. These kernels arise as parametrices of first-order elliptic systems with variable coefficients. Using such integrals (with complex density over the domain and real density over the contour), representations of vector functions that are smooth in the closed domain are described. The Fredholmity of the representation obtained in the corresponding Banach spaces is established. © 2021, Pleiades Publishing, Ltd.	Soldatov A.P., Otelbaev M.. Integral Representations of Vector Functions Based on the Parametrix of First-Order Elliptic Systems // Computational Mathematics and Mathematical Physics. – 2021. - Vol. 61. – P. 964 - 973. DOI: 10.1002/num.22719.
102.	On Green's function of Cauchy–	DOI 10.1186/s13661-021-01544-3	The definition of a Green's function of a Cauchy–Dirichlet problem for the hyperbolic equation in a quarter plane is	Sadybekov M., Derbissaly B. .On Green's function of Cauchy–Dirichlet problem for hyperbolic equation in a

	Dirichlet problem for hyperbolic equation in a quarter plane		given. Its existence and uniqueness have been proven. Representation of the Green's function is given. It is shown that the Green's function can be represented by the Riemann–Green function. © 2021, The Author(s).	quarter plane // Boundary Value Problems. – 2021. - Vol. 2021. DOI: 10.1186/s13661-021-01544-3.
103.	Boundary Conditions of Volume Hyperbolic Potential in a Domain with Curvilinear Boundary	DOI 10.1007/978-3-030-69292-6_20	A one-dimensional volume hyperbolic potential in a domain with curvilinear boundaries is studied. As a kernel of the hyperbolic potential the fundamental solution of the Cauchy problem is chosen. It is well-known that in this case the volume hyperbolic potential satisfies homogeneous initial conditions. The boundary conditions to which the hyperbolic potential satisfies at lateral boundaries of the domain are constructed. It is shown that the formulated initial-boundary value problem has the unique classical solution. © 2021, Springer Nature Switzerland AG.	Sadybekov M., Derbissaly B. . Boundary Conditions of Volume Hyperbolic Potential in a Domain with Curvilinear Boundary // Springer Proceedings in Mathematics and Statistics. – 2021. - Vol. 351. - P. 257 – 271. DOI: 10.1007/978-3-030-69292-6_20
104.	Optimal Cubature Formulas on Classes of Periodic Functions in Several Variables	DOI 10.1134/S0081543821010028	Abstract: We establish sharp order estimates for the error of optimal cubature formulas on the Nikol'skii–Besov and Lizorkin–Triebel type spaces, $B^s_{p,q}(\mathbb{T}^m)$ and $L^s_{p,q}(\mathbb{T}^m)$, respectively, for a number of relations between the parameters s, p, q , and m ($s=(s_1, \dots, s_n) \in \mathbb{R}^n_+$, $1 \leq p, q \leq \infty$, $m=(m_1, \dots, m_n) \in \mathbb{N}^n$).	Bazarkhanov D.B. . Optimal Cubature Formulas on Classes of Periodic Functions in Several Variables // Proceedings of the Steklov Institute of Mathematics. – 2021. - Vol. 312. - P. 16 - 36. DOI: 10.1134/S0081543821010028

			N^m , $m=m_1+\dots+m_n$). Lower estimates are proved via Bakhvalov's method. Upper estimates are based on Frolov's cubature formulas. © 2021, Pleiades Publishing, Ltd.	
105.	Mixed convection in a channel with buoyancy force over backward and forward facing steps: The effects of inclination and geometry	DOI 10.1016/j.csite.2021.101152	This paper presents the computational results of heat transfer for a 2D laminar flow with different channel tilts with forward facing step and backward facing step, taking into account buoyancy forces for various bottom wall lengths. The inclination angle influence on the distribution of velocity and temperature is investigated. The validated numerical algorithm was used to the problem forward and backward facing steps with buoyancy force and at various tilt angles. From the obtained numerical results, it can be noticed that the length of the lower part of the channel has a very strong effect on the flow fluctuation and temperature distribution over the entire channel. It should be noticed that the tilt angle also has a very strong effect on the distribution of flow and temperature. Thus, taking into account the buoyancy force changes the shape of the main recirculation region, but at the same time, regardless of the different tilt angles, the number of vortices does not change, but only the size of the vortices changes. It should also be noticed that when the buoyancy force is taken into account, cooling occurs more efficiently in the middle of the channel. © 2021	Issakhov A., Zhandaulet Y., Abylkassyomova A., Sakypbekova M., Issakhov A.. Mixed convection in a channel with buoyancy force over backward and forward facing steps: The effects of inclination and geometry // Case Studies in Thermal Engineering. – 2021. - Vol. 26. DOI: 10.1016/j.csite.2021.101152

106.	Principal frequency of p-sub-Laplacians for general vector fields	DOI 10.4171/ZAA/1674	In this paper, we prove the uniqueness and simplicity of the principal frequency (or the first eigenvalue) of the Dirichlet p-sub-Laplacian for general vector fields. As a byproduct, we establish the Caccioppoli inequalities and also discuss the particular cases on the Grushin plane and on the Heisenberg group. © European Mathematical Society	Ruzhansky M., Sabitbek B., Suragan D. . Principal frequency of p-sub-Laplacians for general vector fields // Zeitschrift fur Analysis und ihre Anwendung. – 2021. - Vol. 40. – P. 97 – 109. DOI: 10.4171/ZAA/1674
107.	Geometric Hardy Inequalities on Starshaped Sets	ISSN 09446532	We present geometric Hardy inequalities on starshaped sets in Carnot groups. Also, we obtain geometric Hardy inequalities on half-spaces for general vector fields. © Heldermann Verlag	Ruzhansky M., Sabitbek B., Suragan D. . Geometric Hardy Inequalities on Starshaped Sets s // Journal of Convex Analysis. – 2021. - Vol. 28.
108.	Sobolev, Hardy, Gagliardo–Nirenberg, and Caffarelli–Kohn–Nirenberg-type inequalities for some fractional derivatives	DOI 10.1007/s43037-020-00097-4	In this paper, we show different inequalities for fractional-order differential operators. In particular, the Sobolev, Hardy, Gagliardo–Nirenberg, and Caffarelli–Kohn–Nirenberg-type inequalities for the Caputo, Riemann–Liouville, and Hadamard derivatives are obtained. In addition, we show some applications of these inequalities. © 2020, Tusi Mathematical Research Group (TMRG).	Kassymov A., Ruzhansky M., Tokmagambetov N., Torebek B.T.. Sobolev, Hardy, Gagliardo–Nirenberg, and Caffarelli–Kohn–Nirenberg-type inequalities for some fractional derivatives // Banach Journal of Mathematical Analysis. – 2021. - Vol. 15. DOI: 10.1007/s43037-020-00097-4
109.	Cauchy type problems for fractional differential equations	DOI 10.1080/10652469.2021.1900174	While it is known that one can consider the Cauchy problem for evolution equations with Caputo derivatives, the situation for the initial value problems for the Riemann–Liouville derivatives is less understood. In this paper, we propose new type initial, inner, and inner-boundary value problems for fractional differential equations with the Riemann–Liouville derivatives. The results	Karimov E., Ruzhansky M., Tokmagambetov N. . Sobolev, Hardy, Gagliardo–Nirenberg, and Caffarelli–Kohn–Nirenberg-type inequalities for some fractional derivatives // Integral Transforms and Special Functions. – 2021. DOI: 10.1080/10652469.2021.1900174

			<p>on the existence and uniqueness are proved, and conditions on the solvability are found. The well-posedness of the new type of initial, inner, and inner-boundary conditions is also discussed. Moreover, we give explicit formulas for the solutions. As an application fractional partial differential equations for general positive operators are studied. © 2021 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group.</p>	
110.	Direct and inverse problems for time-fractional pseudo-parabolic equations	DOI 10.2989/16073606.2021.192832	<p>The purpose of this paper is to establish the solvability results to direct and inverse problems for time-fractional pseudo-parabolic equations with the self-adjoint operators. We are especially interested in proving existence and uniqueness of the solutions in the abstract setting of Hilbert spaces. © 2021 NISC (Pty) Ltd.</p>	<p>Serikbaev D., Ruzhansky M., Tokmagambetov N., Torebek B.T. . Direct and inverse problems for time-fractional pseudo-parabolic equations // Quaestiones Mathematicae. – 2021. DOI: 2989/16073606.2021.192832</p>
111.	Fractional Klein-Gordon equation with singular mass	DOI 10.1016/j.chaos.2020.110579	<p>We consider a space-fractional wave equation with a singular mass term depending on the position and prove that it is very weak well-posed. The uniqueness is proved in some appropriate sense. Moreover, we prove the consistency of the very weak solution with classical solutions when they exist. In order to study the behaviour of the very weak solution near the singularities of the coefficient, some numerical experiments are conducted where the appearance of a wall effect for the singular masses of the strength of δ^2 is observed. © 2020</p>	<p>Altybay A., Ruzhansky M., Tokmagambetov N., Sebih M.E. . Fractional Klein-Gordon equation with singular mass // Chaos, Solitons and Fractals. – 2021. - Vol. 143. DOI: 10.1016/j.chaos.2020.110579</p>

112.	Fractional Schrödinger Equation with Singular Potentials of Higher Order	DOI 10.1016/S0034-4877(21)00016-1	<p>In this paper the space-fractional Schrödinger equations with singular potentials are studied. Delta like or even higher-order singularities are allowed. By using the regularising techniques, we introduce a family of ‘weakened’ solutions, calling them very weak solutions. The existence, uniqueness and consistency results are proved in an appropriate sense. Numerical simulations are done, and a particles accumulating effect is observed in the singular cases. From the mathematical point of view a “splitting of the strong singularity” phenomena is also observed. © 2021 Polish Scientific Publishers</p>	<p>Altybay A., Ruzhansky M., Tokmagambetov N., Sebih M.E. . Fractional Schrödinger Equation with Singular Potentials of Higher Order // Reports on Mathematical Physics. – 2021. - Vol. 87. – P. 129 – 144. DOI: 10.1016/S0034-4877(21)00016-1</p>
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