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### SUMMARIES

MECHANICAL CHARACTERIZATION OF THE FIELD-DEPENDENT PROPERTIES OF MAGNETOACTIVE POLYMERS AND INTEGRATED ELECTRETS FOR THEIR APPLICATION IN SOFT ROBOTICS. **K. Zimmermann, V. Böhm, T.I. Becker, J. Chavez Vega, T. Kaufhold, G.J. Monkman, D. Sindersonberger, A. Diermeier, N. Prem.** “Problems of Mechanics”. Tbilisi, 2017, № 4(69), pp. 5-18, (Engl.).

Magnetoactive polymer elements undergo reversible magneto-deformation and changes in mechanical modulus when subjected to thermal and magnetic field gradients. This makes the design of actuators and soft microrobots possible. In addition, the integration of electromagnetic and electrostatic elements within magnetoactive polymer actuators has led to the development of a whole range of new smart devices, e.g., adaptive sensors relevant to soft robotics. With the assistance of new 6D printing techniques, it is possible to control additive orientation and the particle diffusion gradient in precise manner. 9 ill. Bibl. 54. Engl.; sum. in Russian.

ANALYSIS OF GENERAL DYNAMIC MODEL OF PLANAR RRRRT TYPE FIVE-BAR HINGED MECHANISMS WITH TWO DEGREES OF FREEDOM WITH CLEARANCE IN THE KINEMATIC PAIRS. **N. Davitashvili, A. Sharvashidze, A. Talakvadze.** “Problems of Mechanics”. Tbilisi, 2017, № 4(69), pp. 19-27, (Engl.).

Is stated the analysis of general dynamic model of planar RRRRT type five-bar hinged mechanisms with two degrees of freedom with three clearances in kinematic pairs. Are revealed all possible conditions of existence of additional and basic motions of mechanism that are describes by 52 differential equations of motion. The obtained results give the possibility to solve the practical task of dynamics of mentioned mechanism with one clearance in connection of two couplers. 2 ill. Bibl. 18. Engl.; sum. in Russian.

DEVELOPMENT OF REMOTE CONTROLLED SYSTEMS TO ENSURE HUMAN SAFETY WHEN WORKING IN POLLUTED ENVIRONMENT. **V. Margvelashvili, R. Phartskhaladze, S. Sharashenidze, I. Zakutashvili.** “Problems of Mechanics”. Tbilisi, 2017, № 4(69), pp. 29-35, (Engl.).

Since permanent terrorist threats, wars and conflicts, today need for detection and neutralization of explosive objects everywhere and permanently present. This work aims to create a light class mobile robot, the main purpose of which is to conduct remote visual and acoustic reconnaissance, search and neutralization of suspicious objects by their destruction, conducting of transport and technological operations. The results of tests of means of neutralization of explosive devices in a light package are represented, namely the gunpowder pulse destroyers of different functions with a quick-detachable equipment. 6 ill. Bibl. 4. Engl.; sum. in Russian.

THEORETICAL RESEARCH OF PLANT'S ROOTS GRINDING PROCESS. **R. Makharoblidze, Z. Makharoblidze, B. Basilashvili.** “Problems of Mechanics”. Tbilisi, 2017, № 4(69), pp. 37-41, (Engl.).

The methodology of calculation of technological processes cutting the agricultural materials, mainly is based on classical theory of engineering calculation of solid materials. It would be mentioned that agricultural products are related to elastic-viscous or viscous-elastic materials. Due the type of materials, the character of deformation is depending on dimensions of material, dynamic factors and physical and mechanical properties. In the article is stated the new method of calculation of technological process of plant materials processing that takes into account the geometrical, mechanical and rheological characteristics of involving in impact materials. Ill. 1, Bibl. 3. Engl.; sum. in Russian.

ON CONSTRUCTION OF ROTOR-GRINDING MACHINES THREE COORDINATE SYSTEM'S DYNAMIC MATHEMATICAL MODEL. **T. Mchedlishvili, T. Kapanadze, Z.**

**Balamtsarashvili, Kh. Amkoladze, N. Nikvashvili.** “Problems of Mechanics”. Tbilisi, 2017, № 4(69), pp. 43-46, (Engl.).

In the previous work are considered related to timber details complex shape surfaces three coordinate form copying grinding process shaping relative movements kinematical analysis. The complexity of this detail profile is stipulated with their longitudinal axes dimensional bending and variety of work pieces cross-section radiuses related to same axis. Also are obtained required for dynamic model construction dependencies. Due the application of obtained in the presented work dependencies is carried out construction of investigated form copying machine tool hydraulic tracing system's dynamical mathematical model. 2 ill. Bibl. 4. Engl.; sum. in Russian.

**THERMAL RESISTANCE AND CUTTING PROPERTIES OF HARD ALLOYS. N. Tevdorashvili, A. Khvadagiani, M. Iremadze.** “Problems of Mechanics”. Tbilisi, 2017, № 4(69), pp. 47-50, (Engl.)

The paper dwells on examining thermal resistance of hard alloys and establishing that cutting properties of alloys (wear resistance) as tungsten-less (TiB – Ti , ZrB<sub>2</sub> – Zr) so tungsten-containing ones (BK8, TH20), largely depends on thermal resistance of these materials. Bibl. 2; sum. in Russian.

**ELASTIC-VISCOUS BODIES DEFORMATION PICTURE ACCORDINGLY OF GENERALIZED MODELS. B. Abesadze.** “Problems of Mechanics”. Tbilisi, 2017, № 4(69), pp. 51-59, (Engl.).

Are stated the generalized models for describing of elastic-viscous bodies, for describing of properties are applied the models that represents certain combination of pure elastic and plastic property bodies. Are compiled combinations of generalized three element models with one elastic and two viscous elements. Are described the relations between stress and strain for each combination. Are obtained creeping, hardening, relaxation curves. Also in the paper are stated four element models with two elastic and two viscous elements. Ill. 6, Bibl. 7. Engl.; sum. in Russian.

**MODERN METHODS OF CALCULATION OF EXPENDITURES IN LOGISTICS. N. Rusadze, T. Morchadze.** “Problems of Mechanics”. Tbilisi, 2017, № 4(69), pp. 61-63, (Engl.).

In the paper are presented the main problems related to calculation of expenditures at solving of scientific and practical tasks in the logistics field, ways of their solution and modern methods of accounting expenses possibility of carry out comprehensive research of system functioning process, stages of performing, their advantages and disadvantages. Bibl. 4. Engl.; sum. in Russian.

**PROPERTIES OF HARMONIC WAVES DISTRIBUTING ALONG THE RIB OF ORTHOGONAL ELASTIC WEDGE. M. Vazagashvili, G. Metreveli.** “Problems of Mechanics”. Tbilisi, 2017, № 4(69), pp. 65-68, (Engl.).

A method for the analytical description of a wave field in an elastic isotropic wedge is proposed that makes it possible to study the properties of a special type harmonic wave localized near the rib-angle of the mode. The analysis of the wave field in a rectangular wedge is carried out and the dependence of the phase velocity of the angular mode on the Poisson ratio is investigated. Bibl. 7. Engl.; sum. in Russian.

**INFLUENCE OF THE SECOND LAW OF THERMODYNAMICS ON THE PROCESSES OF PHASE AND CHEMICAL TRANSFORMATIONS. A. Aptsiauri.** “Problems of Mechanics”. Tbilisi, 2017, № 4(69), pp. 69-73, (Engl.).

In this paper is shown that second law of thermodynamics imposes essential requirements on the processes of phase and chemical transformations. At the same time, as is shown by experimental data, for the vast majority of substances, the laws of transformation are in complete agreement with the second law of thermodynamics. This circumstance makes it possible to formulate an interesting thermodynamic principle for the transformation of substances. Ill. 2, Bibl. 10. Engl.; sum. in Russian.