

SUMMARIES

KINEMATICS OF SPHERICAL HINGED MECHANISMS WITH APPLICATION OF ANALYSIS METHOD OF SPHERICAL TRIANGLES. **N. Davitashvili, V. Abiashvili.** "Problems of Mechanics". Tbilisi, 2016, № 1(62), pp. 5-16, (Engl.).

Is stated the kinematic analysis and synthesis of spherical hinged mechanisms with application of analysis method of spherical triangles. Are obtained expression that defines the positions of output links and their points of spherical four-bar and five-bar hinged mechanisms. Is proved that similar coupler-point curve on surface of sphere would described three four-bar, three five-bar and three six-bar hinged mechanisms. 7 ill. Bibl. 20. Engl.; sum. in Russian.

A GRAPHICAL TECHNIQUE FOR SOLVING THE EULER-SAVARY EQUATION AND THE CUBIC OF STATIONARY CURVATURE. **Nuno T. Sá Pereira.** "Problems of Mechanics". Tbilisi, 2016, № 1(62), pp. 17-22, (Engl.).

This paper presents a graphical technique for solving the Euler-Savary Equation (ESE) and the Cubic of Stationary Curvature (CSC) restricted to cycloidal motion with its circular centrodes. 4 ill. Bibl.3. Engl; sum. in Russian.

STRANGE PROPOERTIES OF WATER AS A PROOF OF INCORRECTNESS OF CARNOT THEORY - POSSIBILITY OF ENERGY GENERATION FROM EQUILIBRIUM ENVIRONMENT. **A. Aptsiauri.** "Problems of Mechanics". Tbilisi, 2016, № 1(62), pp. 23-28, (Engl.).

In the paper, on the example of special properties of water that distinguishes it from all other substances, is shown that, if a thermodynamic system, in addition to heat capacity, has other internal mechanisms of heat storage (phase transformations, chemical reactions, etc.) and heat release process may occur at a higher temperature than reverse process of heat absorption, it is able to generate mechanical energy from the heat of environment. In particular, is considered a three-phase gas-liquid Carnot cycle, which allows generating energy continuously from the heat of the equilibrium environment. Therefore, it is strictly shown that the Carnot theory is valid only for simple, phenomenological systems, and formulated on its basis second law of thermodynamics; in fact, do not have the force of law. The result that fundamentally violates the theory of Carnot and theoretical foundations of contemporary classical thermodynamics is obtained.

Accordingly, searching for fluids for which the freezing temperature decreases markedly with pressure increasing would be considered as one of interesting ways of radical change in modern energy industry. 3 ill. Bibl. 8. Engl.; sum. in Russian.

INVESTIGATION OF TENSILE STRESS ON THE AREA OF THE REINFORCEMENT AND CONCRETE BOND IN STEEL REINFORCED CONCRETE CONSTRUCTIONS. **D.H. Grigoryan.** "Problems of Mechanics". Tbilisi, 2016, № 1(62), pp. 29-35, (Engl.).

The article is dedicated to the issues of the bond of the reinforcement to the concrete, specifically to the influence of their physical and geometrical characteristics on the tensile deformation state on the area of the bond. The distribution of tensions at pulling the insert out of the plate studied by photoelastic method is shown by the photos of isochromes occurring along the entire length of the insert's anchoring into the plate. 6 ill. Bibl. 8. Engl.; sum. in Russian.

MATHEMATICAL MODELING OF AGRICULTURAL UNIT OPERATION ON SLOPE WITH APPLICATION OF SIMILARITY THEORY. **R. Makharoblidze, Z. Makharoblidze.** "Problems of Mechanics". Tbilisi, 2016, № 1(62), pp. 36-41, (Engl.).

In the paper is stated the method of mathematical modeling of agricultural unit operation on a slope with application of similarity theory. For determination of such basic operating parameter as lateral displacement of unit on slope, moment on drive shaft of the tractor are derived dimensionless complexes (criteria of similarity) and are compiled the criteria equations. Is stated the method to transfer of the results of research on physical model in field tests that is confirmed by results of experiments. Bibl. 7. Engl.; sum. in Russian.

THE SECOND ORDER ELLIPTIC DIFFERENTIAL EQUATION WITH ORDER DEGENERATE ON THE PART OF THE BOUNDARY. **G. Devdariani**. "Problems of Mechanics". Tbilisi, 2016, № 1(62), pp. 42-48, (Engl.).

Paper covers second order elliptic differential equation with order degenerate on the part of the boundary. Paper aims to investigate some actual problems for this equation. Such types of equations arise in the theory of prismatic shells with the thickness degenerate. Correctness of the set problems is defended on the power of degenerate and the geometry of the domain boundary. Bibl. 5. Engl.; sum. in Russian.

ANALYSIS OF ECOLOGICAL COMPATIBILITY AND FUEL EFFICIENCY IMPROVEMENT METHODS ON MOTOR TRANSPORT **O. Gelashvili, G. Tabatadze, M. Zurikashvili, T. Niauri, M. Koplataдзе**. "Problems of Mechanics". Tbilisi, 2016, № 1(62), pp. 49-53, (Engl.).

The rapid growth of automobile park for society makes a lot of problems: is consumed expensive petrol products and is polluted environment. It is known that in large cities the environmental pollution up to 80% consists from automobiles harmful exhaust gases and as more motor fuel is used, the more is degree of pollution. Therefore, the issues of fuel efficiency and ecological compatibility are relevant and it has great practical importance to the country. The analysis of carried out in this regard research papers showed that at solution of mentioned issues is not revealed complex approach and often these issues are considered on separate vehicles or hauliers level. The analysis of methods for improvement of ecological compatibility and fuel efficiency shows that it is necessary to develop based on the comprehensive approach method that provides improvement of fuel efficiency and ecological compatibility on motor transport and reduction of environmental impact. Bibl. 4. Engl.; sum. in Russ.

IMPROVEMENT OF PROCESSING ACCURACY AND IDENTIFYING APPLICATION FIELDS OF ROUND BROACHING TOOLING MATERIALS. **N.P. Sakhanberidze**. "Problems of Mechanics". Tbilisi, 2016, № 1(62), pp. 54-58, (Engl.).

For calculation of diametric adjustments and temperature fields of broach cutting teeth, the paper formulates the boundary conditions at cutting with simultaneously working teeth, by taking into account the restored elastic deformations for the next tooth and transient surface hardening after plastic deformation. For each broach tooth, there have been obtained the formulas for calculation of the pressure value in radial directions taking into consideration the cutting process pre-history for each tooth of a broach. 1 ill. Bibl. 3. Engl.; sum. in Russian.

DETERMINATION OF THE DYNAMIC STRESSES AND DEFORMATIONS OF THE ROLLS AT THE METAL CAPTURE. **T. Natriashvili, S. Mebonia**. "Problems of Mechanics". Tbilisi, 2016, № 1(62), pp. 59-64, (Engl.).

The process of shock interaction at capture of the metal on the rolling mills is considered. The methods for determination of dynamical stresses and deformations of the roll due to impact loading are obtained. The methods can be used engineering calculations. 3 ill. Bibl. 8. Engl.; sum. in Russian.