

№ 4(81), 2020

SUMMARIES

RESEARCHER OF IMPACTS IN THE KINEMATIC PAIR OF RRRRT TYPE SPHERICAL FIVE-BAR HINGED MECHANISM WITH TWO DEGREES OF FREEDOM WITH ONE CLEARANCE IN CONNECTION OF TWO COUPLERS. **Keburia N., Davitashvili N.** “Problems of Mechanics”. Tbilisi, 2020, № 4(81), pp. 7-20, (Engl.).

Researcher of impacts in the kinematic pair of RRRRT type spherical five-bar hinged mechanism with two degrees of freedom with one clearance in the connection of two couplers is stated. The research of impacts in the kinematic pair is carried out based on the equations of classical theory of impact. Are explained the momentum of links, that creates the kinematic pair with clearance and with clearance at start and finish of impact. The velocities of links prior impact are determined by systems of differential equations of the additional motions of mechanism, and the velocity after impact is found by research of impact in the kinematic pair. Is derived the value of restoration coefficient and explained its essence. Is solved the numerical example, results of that are presented by diagrams. 17 ill. Bibl. 21. Engl.; sum. in Russian.

THE KINEMATICS OF WHEELS AND CHASSIS CONCEPTS FOR OMNIDIRECTIONAL ROBOTS. **K. Zimmermann, E. Gerlach, I. Zeidis, D. Ruhland, S. Greiser, J. Marx.** “Problems of Mechanics”. Tbilisi, 2020, № 4(81), pp. 21-33, (Engl.).

The presented paper focuses on the kinematic study of four-wheeled robots, which have full omnidirectional motion capabilities. In the first part, the robot is equipped with omnidirectional Mecanum wheels. The special feature of the investigations is the fact that the angles between rollers and the wheel plane can be controlled. In the second part, a specific chassis based on the differential drive principle is considered. The drive module is discussed from the kinematical point of view. Based on this module, a wheel-driven mobile system with omnidirectional movement possibility can be developed, which has the necessary lateral dynamic properties for lane keeping driving. Results of numerical simulations show the possibilities of omnidirectional motion of the robot. 11 ill. Bibl. 12. sum. in Russian.

DEVELOPMENT AND RESEARCH OF MECHANISMS TO ENSURE CONSTANT POINT OF INPUT OF THE TOOL IN THE WORKING AREA. **R.A. Chernetsov, S.A. Skvortsov, G.V. Rashoyan, A.A. Romanov, K.A. Shalyuxin, P.A. Shvecz.** “Problems of Mechanics”. Tbilisi, 2020, № 4(81), pp. 35-43, (Engl.).

The work considers the mechanisms ensuring the constancy of the point of entry of the tool into the working area. These devices are based on the use of bevel gears or belt drives. In addition, first time the solution of the position problem, the velocity problem. At the first time considered mechanism singularity. The design of the current model is presented. 3 ill. Bibl. 19. Engl.; sum. in Russian.

METHOD OF CALCULATION OF THE COMPRESSION MECHANISM OF AN ESSENRTIC-ROD RADIAL FORGING MACHINE. **T. Natriashvili, S. Mebonia, A. Shermaznashvili, M. Ben Chaim.** “Problems of Mechanics”. Tbilisi, 2020, № 4(81), pp. 45-52, (Engl.).

A method is proposed for calculating the details of the compression mechanism of an eccentric-rod radial forging machine, namely, an eccentric shaft, a connecting rod of the stone-backstage type and the bearings of an eccentric shaft. This calculation method makes it possible to determine the main parameters of parts of the eccentric connecting rod compression mechanism of the radial forging machine with sufficient accuracy for engineering calculations. 7 ill. Bibl. 8. Engl.; sum. In Russian.

MODERNISATIONS ON POLISH FISHING VESSELS TO REDUCE ENVIRONMENTAL IMPACT. **O. Klyus, P. Rajewski.** "Problems of Mechanics". Tbilisi, 2020, № 4(81), pp. 53-59, (Engl.).

Fishing limits, high fuel prices, and free freight market. Caused that owners of the fishing vessels started seeking ways for saving money and keep their business profitable. Apart from energy recovery installations, fishing vessels have been furnished with the latest technologies aimed at the reduction of energy consumption and at making ships greener. The paper presents the measurement results of energy consumption in typical operational states based on a selected fishing cutter operating at the Baltic Sea. 6 ill. Bibl. 11. Engl.; sum in Russian.

INVESTIGATION OF TRIBOLOGICAL PROPERTIES OF WEAR RESISTANT SURFACES WELDED BY POWDERY WIRE. **J. Sharashenidze, D. Gventsadze, S. Mebonia, M. Ben Chaim.** „Problems of Mechanics”. Tbilisi, 2020, № 4(81), pp. 61-66, (Engl.).

In the presented work the hard and wear-resistant obtained using a powdery wire and chrome carbide during the electric-arc welding. Tribological properties of these surfaces were studied in the conditions of 0.5 - 2,0MPa loading and 0.63 m/s speed during boundary friction using the 15W40 oil. It was established that under the same conditions the values of the sample's friction coefficients are smaller by the order of magnitude than those of non-welded 40X steel friction pairs. Wear of the welded samples is in significant as well. In comparison to the one-layer surface, two-layer welded one has a less friction coefficient, and at biggest loading, wear was not detected at all. 5 ill. Bibl. 6. Engl.; sum. in Russian.

ON EXACT SOLUTION OF ONE TASK OF MAGNETIC HYDRODYNAMICS. **V. Tsutskiridze, E. Elerdashvili.** "Problems of Mechanics". Tbilisi, 2020, № 4(81), pp. 67-71, (Engl.).

In the article is considered the nonstationary flow of a viscous incompressible conductive fluid in between two planar parallel plates at existence of transversal magnetic fluid. Due the Laplace transformations are obtained the expressions for velocity of fluid and magnetic field. 1 ill. Bibl. 15. Engl.; sum. In Russian.

ANALYSIS OF RING PLATE FROM DIFFERENT MATERIALS. **M. Bekirishvili, Ts. Kurshbadze.** "Problems of Mechanics". Tbilisi, 2020, № 4(81), pp. 73-80, (Engl.).

Abstract: Variants of using an intermittent solution for an annular plate of variable stiffness are presented. The influence of stiffness and strength conditions on the stress-strain state of the plate is analyzed.

In contrast to the primary methods, the model used makes it possible to carry out calculations independently of the boundary conditions, and then take into account the influence of the boundary conditions on the stress-strain state of the plate. Bibl. 7. Engl.; sum. in Russian.