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„International Conference of Experimental and Numerical Investigations and New Technologies“

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The Book of Abstracts

29 June – 02 July 2021

Zlatibor, Serbia

„International Conference of Experimental and Numerical Investigations and New Technologies“

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Hotel Mona, Miladina Pecinara 26, Zlatibor, Serbia

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Title:	International Conference of Experimental and Numerical Investigations and New Technologies – **CNN TECH 2021** **PROGRAMME AND THE BOOK OF ABSTRACTS**
Publisher:	Innovation Center of Faculty of Mechanical Engineering Kraljice Marije 16, 11120 Belgrade 35 tel: (+381 11) 3302-346, fax 3370364 e-mail: cnntechno@gmail.com web site: http://cnntechno.com, http://www.inovacionicentar.rs
Editors:	Dr Goran Mladenovic, Associate Professor Dr Martina Balac, Senior Scientific Researcher Dr Aleksandra Dragicevic, Scientific Researcher
Technical editor	Dr Goran Mladenovic, Associate Professor
Cover page:	Dr Goran Mladenovic, Associate Professor
Printed in:	Innovation Center of Faculty of Mechanical Engineering Kraljice Marije 16 11120 Belgrade 35 tel: (+381 11) 3302-346
Circulation:	100 copies. The end of printing: June 2021.

ISBN: 978-86-6060-077-8

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CONFIGURING A CLASS OF MACHINES BASED ON RECONFIGURABLE 2DOF PLANAR PARALLEL MECHANISM

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Abstract

The parallel 2DOF (Degrees Of Freedom) mechanism presented in this paper is the basis of many research of the authors. There are many significant results for the presented mechanism, and some of them will be presented in this paper. The main goal of the research regarding the parallel mechanism is to create a hardware and software system that will be used to configure machine tools with three or more DOF. The software system consists of two parts. One part is a set of applications intended for machine analysis and defining optimal configuration, and the other part is a control system of the machine adapted to the hardware of the machine, its configuration and its purpose. For the presented mechanism, the kinematic model of the mechanism will be presented first. Based on the kinematic model, equations representing solutions of kinematic problems will be derived. The derived equations will be in a generalized form with some variable parameters of the machine and in such a form correspond to every possible configuration of the reconfigurable mechanism. The equations will initially be used to analyse some basic configurations, and then to analyse some configurations that have not been analysed and presented so far. Also, equations in this form that are applicable for all possible configurations of mechanism, are part of both parts of software system. The final result of the presented procedures is one machine that has optimized parameters in accordance with the appropriate production process and with a configured control system that corresponds to the configuration of the machine.

Keywords

Parallel mechanism, Hybrid mechanism, Complex machine tool, Reconfigurable machine tool, Inverse and direct kinematics problem

Acknowledgement

The presented research was supported by the Ministry of Education, Science and Technological Development of the Republic of Serbia by contract no. 451-03-68/2020-14/200105.