

*Scientific Research Centre  
"MachineStructure"*

*Amazon Kindle Direct Publishing*



**ISSN 2474-5901**

# **Journal of Advanced Research in Technical Science**

**Issue 42**

**Seattle, USA, 2024**

**Journal of Advanced Research in Technical Science. –**  
Seattle, USA: SRC MS, AmazonKDP. –  
2024. – Issue 42. – 107 p.

ISSN 2474-5901

Themes of journal: 1) Mechanical engineering and engineering science; 2) Mathematics and mechanics; 3) Mechatronics and robotics; 4) Transport, mining and construction machinery; 5) Power, metallurgical and chemical engineering; 6) Instrument making, metrology and information-measuring devices and systems; 7) Electrical and Electronics; 8) Informatics, computer engineering and management; 9) Engineering geometry and computer graphics; 10) Materials science; 11) Technology, machinery and equipment of Agroengineering systems; 12) Transport; 13) Construction and architecture; 14) Problems of personnel training in mechanical engineering.

*Editor in Chief:*

Ivan A. Zhukov – Saint-Petersburg mining university. Department of mechanical engineering. Doctor of sciences

*Editorial Board:*

Elvira R. Zvereva – Kazan state power engineering university. Departments of technology in energy and oil and gas processing. Doctor of sciences

Daba N. Radnaev – Buryat state academy of agriculture. Department of mechanization of agricultural processes. Doctor of sciences

Vladimir I. Sarbaev – Moscow polytechnic university. Department of Land Vehicles. Doctor of sciences

Lev A. Saruev – Tomsk polytechnic university. Department of Oil and Gas Business. Doctor of sciences

Aleksandr B. Filimonov – MIREA – Russian technological university. Department of automatic systems. Doctor of sciences

Elena S. Gebel – Omsk state technical university. Department of automation and robotics. Candidate of sciences

Azamat K. Djamankulov – Kyrgyz-Russian Slavic university. Department of mechanics. Candidate of sciences

Oleg S. Krol – Volodymyr Dahl East-Ukrainian National University. Department of engineering, machines and tools. Candidate of sciences

Nikita V. Martyushev – Tomsk polytechnic university. Department of Materials Science. Candidate of sciences

Copyright © 2024 Authors, SRC MS  
All rights reserved.

## CONTENTS

### Mechanical engineering and engineering science

- Fedorova M.A., Rumenko D.N., Varlakova A.R.** Analysis of a new method for experimental determination of Young's modulus..... 5
- Alsigar Masar, Alhafadhi Mahmood.** The modeling of relationship between cutting force and main technological factors in cylindrical grinding..... 10

### Mathematics and mechanics

- Eliseev A.V.** On the commutability of transformations of joints of elements of mechanical oscillatory systems..... 14

### Transport, mining and construction machinery

- Remizovich Yu.V., Abdulaeva O.V.** Conceptual approach to bridge construction development ..... 22

### Power, metallurgical and chemical engineering

- Lashina E.N., Fedoruk S.S.** Methods of solid fuel combustion in boiler units..... 26

### Informatics, computer engineering and management

- Kukitz P.V.** Application of machine learning for personalizing recommendations in the food tech industry ..... 31
- Shaikhulov E.** Estimation and assessment of software testing efforts ..... 42
- Kuznetsov M.A., Maslennikov A.L.** Practical implementation of digital filters in the stabilization system in the laboratory stand "Inverted pendulum on a movable base" ..... 50

*Materials science*

**Biryukov V.P., Goryunov Ya.A., Yakubovsky A.A.** Effect of the polymer composition on the abrasion resistance when tested with a fixed abrasive..... 58

**Biryukov V.P., Goryunov Ya.A., Yakubovsky A.A.** Determination of resistance to abrasive wear of polymers during friction with loose abrasive..... 63

**Biryukov V.P.** Effect of the polymer composition on the moment of friction paired with 40X steel..... 68

**Lukyanov A.I.** Carbon-carbon composite in a sliding bearing as an alternative to fluoroplast..... 73

**Roshchin M.N.** Tribological tests of carbon-carbon material Carbon..... 76

**Roshchin M.N.** Laser reflow of a gas-thermal coating on 30HGSA steel..... 79

*Technology, machinery and equipment of Agroengineering systems*

**Nazarov A.N., Lyutyj A.V.** Software for evaluation of operational and technological indicators of agricultural machinery as an element of the educational process..... 83

**Voinash S.A.** Development and implementation of improved openers sowing equipment ..... 93

*Problems of personnel training in mechanical engineering*

**Lashina E.N.** Motivation for educational activity. Activation of cognitive activity of students in a technical university when teaching English..... 97

**Lashina E.N.** Professionally oriented reading in English as a means of developing communicative competence of students of technical universities..... 102

Scientific periodical issue

ISSN 2474-5901

# Journal of Advanced Research in Technical Science

Issue 42

---

*Founder:* Elena V. Zhukova.

*Editorial:* Scientific Research Centre «MachineStructure».

*Editor in chief:* Ivan A. Zhukov.

*Printed by* AmazonKDP, Seattle WA.

*Publication Date:* 08.07.2024.

*Title ID:* 24-15.

*Trim Size:* 7" x 10" (17.78 x 25.4 cm).

*Number of copies:* 50 min.

Seattle, USA:

Scientific Research Centre «MachineStructure», Amazon Kindle Direct Publishing  
2024