

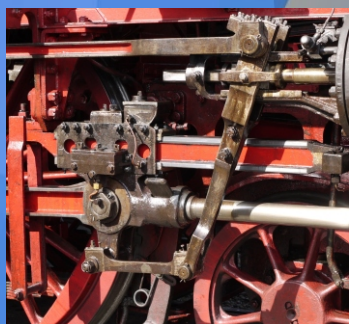
INTERNATIONAL SCIENTIFIC JOURNAL

INDUSTRY 4.0

ISSN (PRINT) 2534-8582

ISSN (WEB) 2534-997X

YEAR X ISSUE 1/2025



①



②



③



④



**PUBLISHED BY
SCIENTIFIC TECHNICAL UNION OF MECHANICAL ENGINEERING
“INDUSTRY 4.0”, BULGARIA**

INTERNATIONAL SCIENTIFIC JOURNAL

INDUSTRY 4.0

YEAR X, ISSUE 1 / 2025

ISSN (PRINT) 2534-8582, ISSN (WEB) 2534-997X

PUBLISHER

SCIENTIFIC TECHNICAL UNION OF MECHANICAL ENGINEERING "INDUSTRY 4.0"

108, Rakovski Str., 1000 Sofia, Bulgaria

tel. (+359 2) 987 72 90,

tel./fax (+359 2) 986 22 40,

office@stumejournals.com

WWW.STUMEJOURNALS.COM

EDITOR IN CHIEF

Prof. D.Sc. Georgi Popov, DHC, Technical University of Sofia, BG

All articles are published after peer review by two independent reviewers.

EDITORIAL BOARD

Members:

Acad. Igor Bychkov, RU
Cor. member Alexey Belyi, BY
Cor. member Svetozar Margenov, BG
Prof. Alexander Afanasyev, RU
Prof. Alexander Guts, RU
Prof. Alshyn Altybayev, KZ
Prof. Andrzej Golabczak, PL
Prof. Bobek Shuklev, MK
Prof. Boris Gordon, EE
Prof. Branko Sirok, SI
Prof. Claudio Melchiorri, IT
Prof. Cveta Martinovska, MK
Prof. Dale Dzemydiene, LT
Prof. Dimitar Yonchev, BG
Prof. Dimitrios Vlachos, GR
Prof. Dobre Runchev, NM
Prof. Dragan Perakovic, HR
Prof. Galina Nikolcheva, BG
Prof. Galina Zhavoronkova, UA
Prof. Gerard Lyons, IE
Dr. Giovanni Pappalettera, IT
Prof. Henrik Carlsen, DK
Prof. Idilia Bachkova, BG
Prof. Idit Avrahami, IL
Prof. Inocentiu Maniu, RO
Prof. Iurii Bazhal, UA
Prof. Jürgen Köbler, DE
Prof. Jiri Maryska, CZ
Prof. Katia Vutova, BG
Prof. Lappalainen Kauko, FI
Dr. Liviu Jalba, RO

Prof. Luigi del Re, AT
Prof. Majid Zamani, DE
Dipl.-Kfm. Michael Grethler, DE
Prof. Michael Valasek, CZ
Prof. Milija Suknovic, RS
Prof. Miodrag Dashic, RS
Prof. Mohammed Taleb Obaidat, JO
Prof. Murat Alanyali, TR
Prof. Nadežda Jankelová, SK
Prof. Nafisa Yusupova, RU
Prof. Nina Bijedic, BA
Prof. Ninoslav Marina, MK
Prof. Olga Zaborovskaia, RU
Prof. Pavel Kovach, RS
Prof. Petar Kolev, BG
Prof. Peter Korondi, HU
Prof. Peter Sincak, SK
Prof. Petra Bittrich, DE
Prof. Predrag Dasic, RS
Prof. Radu Dogaru, RO
Prof. Raul Turmanidze, GE
Prof. René Beigang, DE
Prof. Rozeta Miho, AL
Prof. Salloom A. Al-Jaboori, JO
Prof. Seniye Ümit Oktay Firat, TR
Prof. Sreten Savicevic, ME
Prof. Sveto Svetkovski, MK
Prof. Tomislav Šarić, HR
Prof. Vasile Cartofeanu, MD
Prof. Vjaceslavs Bobrovs, LV
Prof. Vladyslav Alieksiev, UA

TECHNICAL EDITORS:

M. Sc. eng. Radoslav Daskalov, Bulgaria
M. Sc. eng. Oleg Mihailov, Bulgaria

CONTENTS

TECHNOLOGICAL BASIS OF “INDUSTRY 4.0”

Approach of Artificial Intelligence to accelerate FEM simulations Olga Karakostopulo	3
Distributed Task Allocation Based on Hierarchical Interactions in Wasp Colonies Dorian Minarolli, Hakik Paci	7
Evolution of predictive analysis using GPT OpenAI models Mihail Mateev	10

DOMINANT TECHNOLOGIES IN “INDUSTRY 4.0”

Simulation-Based Analysis for Optimization of Sterilization Devices in Plasma-Based Ion Implantation Technology Kohaku Osugi, Koji Kakugawa, Keita Ashio, Yohta Tsukamoto, Mao Ushida, Takeshi Tanaka	14
Electrical and thermal monitoring for remote diagnostics of X-ray generators Nikolay Zografov, Ivan Garkov, Dimitar Todorov	18
Measurement comparison between 3D model of the promotional school windmill shaft and two different prototypes made on a 3D printer Ender 3 S1 Plus Vid Božič	21
Two-dimensional WS2 layer in sensor application Robert Andok, Katia Vutova, Ivan Kostic, Evgeniy Manoilov	25
Investigation on maximum tensile force and Shore D hardness of 3D printed samples of Polyamide PA6-CF Konstantin Chukalov	27

BUSINESS & “INDUSTRY 4.0”

Increasing the competitiveness of business organizations through reducing energy consumption and effective energy management Krasimira Dimitrova	30
The innovation environment in Bulgaria – opportunities and challenges Toni Mihova, Valentina Nikolova-Alexieva, Marian Tzankov	34
Digitalization, business and digital management systems Migena Zeqo, Valma Prifti	36

SOCIETY & „INDUSTRY 4.0”

Monitoring of the Oghaskura River using the Arduino-based sensor systems Natia Kamkamidze, Lamara Gobejishvili, Nino Tsutskiridze, Natia Khazaradze	40
---	----