

# PROCEEDINGS

---

of the Union of Scientists - Ruse

---

Book 5

## Mathematics, Informatics and Physics



Volume 13, 2016



RUSE

# PROCEEDINGS

---

of the Union of Scientists - Ruse

---

Book 5  
**Mathematics, Informatics and  
Physics**

Volume 13, 2016



RUSE

# **PROCEEDINGS**

## **OF THE UNION OF SCIENTISTS - RUSE**

---

### **EDITORIAL BOARD**

#### **Editor in Chief**

Prof. Zlatojivka Zdravkova, PhD

#### **Managing Editor**

Assoc. Prof. Tsetska Rashkova, PhD

#### **Members**

Assoc. Prof. Petar Rashkov, PhD

Prof. Margarita Teodosieva, PhD

Assoc. Prof. Nadezhda Nancheva, PhD

#### **Print Design**

Assist. Prof. Victoria Rashkova, PhD

#### **Union of Scientists - Ruse**

16, Konstantin Irechek Street

7000 Ruse

BULGARIA

Phone: (++359 82) 828 135,

(++359 82) 841 634

E-mail: [suruse@uni-ruse.bg](mailto:suruse@uni-ruse.bg)

web: [suruse.uni-ruse.bg](http://suruse.uni-ruse.bg)

#### **Contacts with Editor**

Phone: (++359 82) 888 738

E-mail: [zzdravkova@uni-ruse.bg](mailto:zzdravkova@uni-ruse.bg)

---

# **PROCEEDINGS**

**of the Union of Scientists – Ruse**

**ISSN 1314-3077**

# **Proceedings of the Union of Scientists – Ruse**

Contains five books:

1. Technical Sciences
2. Social Sciences
3. Agrarian and Veterinary Medical
4. Sciences Medicine and Ecology
5. Mathematics, Informatics and Physics

**BOARD OF DIRECTORS OF THE US - RUSE**

1. Prof. Hristo Beloiev, DSc – Chairman
2. Assoc. Prof. Vladimir Hvarchilkov – Vice-Chairman
3. Assoc. Prof. Teodor Iliev – Secretary in Chief

**SCIENTIFIC SECTIONS WITH US - RUSE**

1. Assoc. Prof. Aleksandar Ivanov – Chairman of "Machine-building Sciences and Technologies" scientific section
2. Prof. Ognjan Alipiev – Chairman of "Agricultural Machinery and Technologies" scientific section
3. Assoc. Prof. Ivan Evtimov– Chairman of "Transport" scientific section
4. Assoc. Prof. Teodor Iliev – Chairman of "Electrical Engineering, Electronics and Automation" scientific section
5. Assist. Prof. Diana Marinova – Chairman of "Agrarian Sciences" scientific section
6. Svilen Dosev, MD – Chairman of "Medicine and Dentistry" scientific section
7. Assoc. Prof. Vladimir Hvarchilkov – Chairman of "Veterinary Medical Sciences" scientific section
8. Assist. Prof. Anton Nedjalkov – Chairman of "Economics and Law" scientific section
9. Assoc. Prof. Tsetska Rashkova – Chairman of "Mathematics, Informatics and Physics" scientific section
10. Assoc. Prof. Ljubomir Zlatev – Chairman of "History" scientific section
11. Assoc. Prof. Rusi Rusev – Chairman of "Philology" scientific section
12. Prof. Penka Angelova, DSc– Chairman of "European Studies" scientific section
13. Prof. Antoaneta Momchilova - Chairman of "Physical Education, Sport and Kinesiterapy" section

**CONTROL PANEL OF US - RUSE**

1. Assoc. Prof. Jordanka Velcheva
2. Assoc. Prof. Nikolai Kotsev
3. Assist. Prof. Ivanka Dimitrova

**EDITOR IN CHIEF OF PROCEEDINGS OF US - RUSE**

Prof. Zlatojivka Zdravkova

**The Ruse Branch of the Union of Scientists in Bulgaria**

was founded in 1956. Its first Chairman was Prof. Stoyan Petrov. He was followed by Prof. Trifon Georgiev, Prof. Kolyo Vasilev, Prof. Georgi Popov, Prof. Mityo Kanev, Assoc. Prof. Boris Borisov, Prof. Emil Marinov, Prof. Hristo Beloev. The individual members number nearly 300 recognized scientists from Ruse, organized in 13 scientific sections. There are several collective members too – organizations and companies from Ruse, known for their success in the field of science and higher education, or their applied research activities. The activities of the Union of Scientists – Ruse are numerous: scientific, educational and other humanitarian events directly related to hot issues in the development of Ruse region, including its infrastructure, environment, history and future development; commitment to the development of the scientific organizations in Ruse, the professional development and growth of the scientists and the protection of their individual rights.

The Union of Scientists – Ruse (US – Ruse) organizes publishing of scientific and popular informative literature, and since 1998 – the “Proceedings of the Union of Scientists- Ruse”.

---

**BOOK 5**

**"MATHEMATICS,  
INFORMATICS AND  
PHYSICS"**

**VOLUME 13**

CONTENTS

**Mathematics**

<i>Diko M. Souroujon</i> .....	7
Heteroclinic solutions on a second-order difference equation	
<i>Nikolay Dimitrov</i> .....	16
Multiple solutions for a nonlinear discrete fourth order p-Laplacian equation	
<i>Nikolay Dimitrov</i> .....	26
Existence of solutions of second order nonlinear difference problems	
<i>Veselina Evtimova</i> .....	33
Assessment of the characteristics of the system ‘center for emergency medical aid’ for the provision of timely service to patients	
<i>Md Sharif Uddin, M. Nazrul Islam, Iliyana Raeva, Aminur Rahman Khan</i> .....	40
Efficiency of allocation table method for solving transportation maximization problem	
<i>Tsetska Rashkova, Nadejda Danova</i> .....	49
An application of the symmetric group in colouring objects	

**Informatics**

<i>Olga Gorelik, Elena Malysheva, Katalina Grigorova</i> .....	55
Integrated model of educational process with elements of foreign educational programs	
<i>Galina Atanasova, Katalina Grigorova</i> .....	62
The place and the role of business processes generation in their life cycle	
<i>Galina Atanasova, Ivaylo Kamenarov</i> .....	68
Business process generation opportunities	
<i>Kamelia Shoylekova, Peter Sabev</i> .....	74
Tools implementing integrated solutions to analysis and transformations of business processes through Petri Nets	
<i>Victoria Rashkova</i> .....	81
Possibilities and protection capabilities of social networks	

---

**BOOK 5**  
**"MATHEMATICS,  
INFORMATICS AND  
PHYSICS"**  
**VOLUME 13**

*Valentin Velikov, Iliya Mutafov* .....90  
Logical data pre-processing for the Hearthstone game

*Iva Kostadinova, Georgi Dimitrov, Svetlozar Tsankov*.....99  
Good practices in the learning process of "Digital" generation  
in Bulgaria

*Yoana Hadzhiyska, Ivan Ivanov, Georgi Dimitrov,  
Alexey Bychkov* .....106  
One approach for determining the final evaluation criteria for  
institutional accreditation of a higher school through intelligent  
data processing

**Physics**

*Galina Krumova*.....115  
Natural orbital approach and local scale transformation  
method for description of some ground and monopole  
excited state characteristics of Nuclei