

**FOURTEENTH INTERNATIONAL CONFERENCE  
ON ELECTRICAL MACHINES,  
DRIVES AND POWER SYSTEMS**

**40<sup>th</sup> anniversary of**

**ELMA 2015**

**1975-2015**

**PROGRAMME**

**2 – 3 October 2015  
Varna, BULGARIA**

**FOURTEENTH INTERNATIONAL CONFERENCE  
ON ELECTRICAL MACHINES,  
DRIVES AND POWER SYSTEMS**

**ELMA 2015**

**2-3 October 2015, Varna, Bulgaria**

**Organized by:**

**Technical University of Varna**

**Union of Electronics, Electrical Engineering and Telecommunications (CEEC) –  
EUREL member**

**Technical University of Sofia, Bulgaria**

**University of Rousse, Bulgaria**

**Under the patronage of the Rector  
of the Technical University of Varna**

**PROGRAMME**

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Vladimir LAZAROV  
Bohos APRAHAMIAN

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Georgi TODOROV, Technical University of Sofia and CEEC  
Ivan PALOV, University of Rousse  
Lubomir DIMITROV, Technical University of Varna  
Marin MARINOV, Technical University of Varna and CEEC  
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## CONFERENCE VENUE

**Fourteenth International Scientific Conference on Electrical Machines, Drives and Power Systems  
ELMA 2015 will be held in Varna, in the Technical University of Varna and Varna Municipality**  
Conference site: <http://elma.vtp-tuv.com>  
e-mail: [elma@vtp-tuv.com](mailto:elma@vtp-tuv.com)

## TIME-TABLE

Day	Time	Varna Municipality
Friday, 2 October	9:00	Registration
	10:00-11:30	Plenary Session (Plenary Hall)
	11:30	Coffee Break
	13:00-16:00	Round Table (Varna Hall)
	19:00	Conference Dinner (Restaurant of Varna Municipality)

<b>Day</b>	<b>Time</b>	<b>Hall 1</b>	<b>Hall 2</b>	<b>Hall 3</b>	<b>Hall 4</b>	<b>Lobby</b>
Saturday 3, October	9:00-11:00	EMT	PEM, EMN	RES EE	CS	PS1 PS2
	11:00- 11:30	Coffee Break				

### SESSIONS AND HALLS

Electrical Machines and Transformers	EMT
Control Systems, Electrical Drives, Robotics and Mechatronics	CS
Power Electronics and Microelectronics	PEM
Renewable Energy Sources	RES
Energy Efficiency and Power Quality	EE
Electrotechnology, Micro and Nanoengineering, Monitoring and Diagnostics	EMN
Posters	PS
Hall 1	Hall 814, EF
Hall 2	Hall 815, EF
Hall 3	Hall 701, EF
Hall 4	Hall 202, EF

**PROGRAMME**  
**FOURTEENTH INTERNATIONAL CONFERENCE**  
**ON ELECTRICAL MACHINES,**  
**DRIVES AND POWER SYSTEMS**

**Friday, 2 October**

**09:00**

**Registration**  
**Municipality Varna**

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**PLENARY SESSION**

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**Friday, 2 October**

**Plenary Hall – Municipality Varna**

**10:00**

Chairman: Bohos Aprahamian

1. ELMA CONFERENCE – BRIEF HISTORY

*Bohos Aprahamian*

2. ELECTRICAL MACHINES DEVELOPMENT IN TU – SOFIA DURING 20-TH AND 21-ST CENTURY

*Vladimir Lazarov*

3. MODERN APPROACHES TO CALCULATION AND ANALYSIS OF ELECTRICAL MACHINES

*Gancho Bojilov*

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**COFFEE BREAK**

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**Friday, 2 October**

**11:30**

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**ROUND TABLE**

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**Friday, 2 October**

**Varna Hall – Municipality Varna**

**13:00 – 16:00**

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**CONFERENCE DINNER**

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**Friday, 2 October**

**Restaurant of Varna Municipality**

**19:30**

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## ELECTRICAL MACHINES AND TRANSFORMERS

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**Saturday, 3 October**  
**Conference Hall – 814 EF**  
**09:00**

Chairman: Vladimir Lazarov

1. THE APPLICATION OF FINITE ELEMENT METHOD FOR DETERMINING THE THD IN THE ELECTROMOTIVE FORCE IN A SYNCHRONOUS MACHINE WITH PERMANENT MAGNETS UNDER DIFFERENT LOADS  
*Plamen Rizov, Radoslav Spasov, Tsvetomir Stoyanov, Victor Zahariev*
2. HYBRID DIVERTER SWITCH  
*Nikolay Gourov*
3. ANALYTICAL MODEL FOR SIZING THE MAGNETS OF PERMANENT MAGNET SYNCHRONOUS MACHINES  
*George Todorov, Bozhidar Stoev*
4. INVESTIGATIONS OF SINGLE-PHASE COLLECTOR MOTOR DRIVE SYSTEM WITH SOFT-SWITCHED QUASI RESONANT DC LINK INVERTER  
*Dimitar Spirov, Milko Dochev*
5. ELECTRIC CAR PROPULSION WITH INDUCTION MOTOR  
*Dilo Dilov, Emil Sokolov*
6. RESULTS OF TEST OF NEW TYPE OF SYNCHRONOUS GENERATOR MULTIFUNCTIONAL PROTECTION DEVICE  
*Dimitar Bogdanov, Nelly Harizanova*
7. OPTIONS FOR TEST OF ELECTRICAL PROTECTIONS WITHOUT TAKING THE PROTECTED OBJECT OUT OF OPERATION  
*Dimitar Bogdanov*

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**11:00-11:30 COFFEE BREAK**

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**Saturday, 3 October**



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**POWER ELECTRONICS AND MICROELECTRONICS  
ELECTROTECHNOLOGY, MICRO AND NANOENGINEERING**

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**Saturday, 3 October  
Hall 815 Faculty of Electrical Engineering  
9:00**

Chairman: Maria Marinova

1. RESEARCH OF SERIAL INVERTER WITH REVERSE DIODES FOR INDUCTION MELTING OF METALS  
*Rumen Dimitrov Karov, Daniel Rumenov Karov, Dimitar Ivanov Kukurigov*
2. OVERVIEW AND EVALUATION ON TECHNIQUES FOR MEASUREMENT OF POWER LOSSES IN ELECTRONIC SWITCHES FOR POWER ELECTRONIC CONVERTERS  
*Emil Ganchev Rosenov*
3. COMPUTER AND EXPERIMENTAL SET-UP FOR EVALUATION OF POWER LOSSES IN MOSFETS AND IGBTs  
*Angel Marinov, Emil Rosenov, Dimitar Kovachev*
4. OPPORTUNITIES FOR APPLICATION OF ELECTROTECHNOLOGICAL METHODS WHEN PROCESSING VEGETABLE OILS  
*Vladimir Georgiev Todorov, Bohos Rupen Aprahamian, Hristofor Petkov Tahrilov*

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**11:00-11:30 COFFEE BREAK**

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**Saturday, 3 October**

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**RENEWABLE ENERGY SOURCES, MONITORING AND DIAGNOSTICS**  
**ENERGY EFFICIENCY AND POWER QUALITY**

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**Saturday, 3 October**  
**Hall 701 Faculty of Electrical Engineering**  
**9:00**

Chairman: Ljubomir Dimitrov

1. COMPENSATION OF WIND POWER FLUCTUATIONS IN AN AUTONOMOUS HYBRID SYSTEM COMPRISING A WIND GENERATOR AND MICRO GAS TURBINES  
*Hristiyan Kanchev, Bruno François, Zahari Zarkov, Ludmil Stoyanov, Vladimir Lazarov*
2. STUDY OF A POSSIBILITY TO MONITOR THE ENERGY EFFICIENCY IN MARINE POWER SYSTEMS  
*Dimitar M. Dimitrov, Petko D. Petkov*
3. POSSIBILITIES FOR IMPROVEMENT OF ENERGY EFFICIENCY ACCORDING TO QUALITY OF ELECTRICAL ENERGY IN SHIPBOARD POWER SYSTEMS WITH THE USE OF INDEX EEDI  
*Ginka Ivanova*
4. STUDY OF THE CONTENTS AND THE SHARE OF ABNORMAL HARMONICS, DUE TO WORK OF THE POWER CONVERTERS  
*Rumen Kirov, Vladimir Chikov, Nikola Makedonski, Ginka Ivanova, Ilian Iliev*
5. ASSESSMENT OF TECHNICAL STATE OF POWER TRANSFORMERS THROUGH CONTINUING OPERATION  
*Ljubomir Dimitrov, Stefka Kanturska, Todor Penev*
6. SOME STUDIES ON THE ENERGY CHARACTERISTICS OF DRIVERS FOR LED  
*Mincho Peev, Dimitar Dimitrov*
7. STUDY ON SOME NEW INDICES FOR ELECTRICAL POWER QUALITY IN INDUSTRIAL ELECTRICAL DISTRIBUTION NETWORKS WITH THE USE OF POWER MEASUREMENT AND CONTROL SYSTEMS  
*Valentin Gyurov*
8. STUDY ON REACTIVE POWER COMPENSATION AND HARMONIC FILTERING WITH PHYSICAL LABORATORY MODEL  
*Valentin Gyurov*
9. COMPARATIVE ANALYSIS OF THE INFLUENCE OF EXPLOITATION PARAMETERS ON THE ENERGY EFFICIENCY OF ELECTRIC HOT PLATES  
*Yanita Slavova, Marinova Mariya*
10. ENERGY EFFICIENCY IN CAPACITIVE LOADS COMPENSATION  
*Vultchan Gueorgiev, Plamen Rizov*

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**11:00-11:30 COFFEE BREAK**

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**Saturday, 3 October**

## POSTER SESSION 1

**Saturday, 3 October**  
**Lobby - Faculty of Electrical Engineering**  
**09:00**

Chairman: Maik Streblau

1. STUDY OF THE ELECTROMAGNETIC CHARACTERISTICS OF SYNCHRONOUS GENERATOR BY REPLACEMENT OF EXCITATION WINDING WITH PERMANENT MAGNETS  
*Marin Marinov, Maik Streblau, Todor Penev, Bohos Aprahamian*
2. ONE APPROACH TO DETERMINATE THE TERMINALS OF THE STATOR WINDING OF THREE-PHASE AC MOTORS  
*Maik Streblau*
3. INFLUENCE OF AIR GAP ON THE LOSSES AND EFFICIENCY OF SALIENT AND NON-SALIENT POLE SYNCHRONOUS HYDRO GENERATORS  
*Dimitar Sotirov, Valentin Filipov, Angel Bahchevanski*
4. COMPARATIVE ANALYSIS OF SOFTWARE PRODUCTS FOR CREATING THERMAL MODELS AND ANALYSIS OF THERMAL PROCESSES IN THE COMMUTATOR MOTORS  
*Vasil Tepedelenev, Bohos Aprahamian, Marin Marinov*
5. REALTIME FPGA IMAGE PROCESSING AND ROBOTIC NAVIGATION  
*Rosen Spirov, Neli Grancharova, Georgi Angelov*
6. MODEL SCHEME OF THE EARTHING SYSTEM OF ELECTRICAL POWER SUBSTATIONS FOR WAVE PROCESSES STUDY  
*Margreta Vasileva, Rositsa Dimitrova, Marinela Yordanova, Milena Ivanova*
7. SIMULATION MODELING OF THE EMERGING AND LIMITATION OF THE ATMOSPHERIC SURGES IN 110 KV ELECTRICAL SUBSTATIONS  
*Neli Velikova*
8. ELECTRICAL SAFETY ASSESSMENT AT EARTH FAULT PROTECTION SETTING IN MEDIUM VOLTAGE ELECTRICAL NETWORKS  
*Marinela Yordanova, Mediha Mehmed-Hamza*
9. CONTROL END ENERGY EFFICIENCY OF THE SYSTEM FOR INTELIGENT MEASUREMENT, REGISTERING AND CONTROL IN ELECTRICAL SUBSTATION  
*Rosen Vasilev, Vladimir Chikov, Valentin Gyurov, Ivaylo Nedelchev*
10. THERMAL POWER GENERATORS IN OPTIMIZATION OF RESIDENTIAL SOLAR HOT WATER SYSTEM  
*Alexander Gaydardzhiev, Todor Penev, Izabel Mateva*
11. INVESTIGATION CHARACTERISTICS OF DC-DC CONVERTER WITH OPTOCOUPERS  
*Cvetelina Velikova, Alexander Savov*
12. WIND TURBINE EMULATOR WITH DC MOTOR DRIVE  
*Zahari Zarkov, Valentin Milenov*

13. MODELLING THE ELECTRIC FIELD BETWEEN A POINT-TO-WORKING CHAMBER ELECTRODE SYSTEM FOR PRE-SOWING TREATMENT OF SEEDS OF VEGETABLE CROPS  
*Kiril Sirakov*
14. OPTIMIZATION OF THE STRUCTURE OF A LABORATORY CHAMBER FOR PRE-SOWING ELECTROMAGNETIC TREATMENT OF THE SEEDS OF VEGETABLE CROPS  
*Kiril Sirakov*
15. VOLT-AMPERE CHARACTERISTICS AND APPLICATION OF A PLASMOTRON WORKING WITH PLASMA FORMING GASES WATER STEAM AND AIR  
*Bojidar Dyakov, Bohos Aprahamian*
16. EXPERIMENTAL STUDY ON PIPELINE CLEANING FROM DEPOSITS WITH ELECTRICAL DISCHARGES IN WATER  
*Lyubomir Dankov*
17. SOME PROBLEMS IN THE HEAT TREATMENT OF GLASSWARE IN RESISTIVE ELECTRIC FURNACES  
*Nadezhda Tsvetkova*
18. INVESTIGATION ON PLASMA-AIDED SURFACE FINISHING OF EUROPEAN WHITE PINE (PINUS SYLVESTRIS) BY XPS-ANALYSIS  
*Ivaylo Ivanov, Dyliana Gospodinova, Peter Dineff*
19. DESIGN OF CYLINDRICAL INDUCTORS FOR SURFACE HARDENING OF STEEL DETAILS THROUGH THE USE OF HIGH FREQUENCY INDUCTION SYSTEM  
*Strahil Atanasov, Bohos Aprahamian, Todor Penev*
20. APPLICATION OF THE MAGNETIC FIELD IN SEPARATION OF BIOLOGICAL PRODUCTS  
*Tatyana Dimova, Maria Marinova, Bohos Aprahamian, Maik Streblau*

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**11:00-11:30 COFFEE BREAK**

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**Saturday, 3 October**

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**CONTROL SYSTEMS, ELECTRICAL DRIVES, ROBOTICS AND  
MECHATRONICS**

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**Saturday, 3 October**  
**Conference Hall – 202 EF**  
**09:00**

Chairman: Emil Marinov

1. THEORETICAL ANALYSIS OF A POLARIZATION FLOW METER WITH A CIRCULAR CROSS SECTION WHILE TAKING THE PIPE THICKNESS INTO ACCOUNT  
*Andrey Dimitrov Andreev*
2. EXPLORATION OF THE POSSIBILITIES FOR ANALYSIS OF NON-LINEAR ELECTRIC CIRCUITS WORKING AT DC REGIMES USING VARIATIONAL APPROACH  
*Miroslava Grisheva Doneva, Vyara Yordanova Vasileva*
3. EXPLORATION OF THE POSSIBILITIES OF THE VARIATIONAL APPROACH FOR ANALYSIS OF TRANSIENT PROCESSES IN ELECTRIC CIRCUITS  
*Emil Ivanov Panov, Miroslava Grisheva Doneva*
4. ADAPTIVE VECTOR CONTROL OF PERMANENT MAGNET SYNCHRONOUS MOTOR  
*Emil Marinov, Tsvetomir Todorov, Zhivko Zhekov, Nikolay Petkov*
5. SENSORLESS VECTOR CONTROL OF INDUCTION MOTOR  
*Zhivko Zhekov*

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**11:00-11:30 COFFEE BREAK**

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**Saturday, 3 October**

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## POSTER SESSION 2

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**Saturday, 3 October**  
**Lobby - Faculty of Electrical Engineering**  
**09:00**

Chairman: Yanita Slavova

1. MODERNIZING THE EXCITATION SYSTEMS OF SYNCHRONOUS GENERATORS OF BULGARIAN MERCHANT FLEET SHIPS  
*Todor P. Lazarov*
2. LED LAMP WITH LUMINOUS FLUX RESEMBLING THE SOLAR RADIATION'S SPECTRAL DISTRIBUTION  
*Petko Mashkov, Berkant Gyoch, Rostislav Kandilarov, Hristo Beloev, Tamara Pencheva*
3. METHOD FOR LED LAMPS' SPECTRAL CHARACTERISTICS CONTROL  
*Petko Mashkov*
4. MULTIFUNCTIONAL LED MODULE FOR POULTRY LIGHTING  
*Petko Mashkov, Berkant Gyoch, Tamara Pencheva, Hristo Beloev, Rostislav Kandilarov*
5. OPPORTUNITIES FOR USING PHOTOVOLTAIC POWER STATIONS TO ROAD TUNNELS  
*Angel Pachamanov, Borislav Pregyov, Stoyan Petrov, Peter Stoev*
6. PROPAGATION OF ELECTROMAGNETIC WAVES BETWEEN WIRELESS SENSOR NODES IN ONE CORRIDOR  
*Zlatan Ganev, Sava Savov*
7. OUTDOOR PROPAGATION OF ELECTROMAGNETIC WAVES BETWEEN WIRELESS SENSOR NODES  
*Zlatan Ganev*
8. DIGITAL LIGHT MODULATOR AND DETECTOR UNITS  
*Psycho Popov*
9. STUDY OF ASTIGMATIC FOCUS CORRECTION METHOD IN OPTICAL DISCS HEADS  
*Berkant Gyoch*
10. SOME PROBLEMS IN TEACHING ON THEORETICAL ELECTRICAL ENGINEERING IN TECHNICAL UNIVERSITY OF SOFIA  
*Simona Petrakieva*
11. ON THE DEFINITION OF METHODICALLY SWITCHING BY MONGE PROJECTION TO AXONOMETRY  
*Aleksandrina Bankova*
12. METHODOLOGY FOR CONSTRUCTION OF PLANES SECTIONS OF UNITS IN THE METHOD OF PLANES AUXILIARY SEKULA. CONIC SECTIONS  
*Aleksandrina Bankova*