

# **2025 Tenth Conference on Lighting (Lighting 2025)**

**Sozopol, Bulgaria  
4-6 June 2025**



**IEEE Catalog Number: CFP25V04-POD  
ISBN: 979-8-3315-1292-7**

**Copyright © 2025 by the Institute of Electrical and Electronics Engineers, Inc.  
All Rights Reserved**

*Copyright and Reprint Permissions:* Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

***\*\*\* This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP25V04-POD
ISBN (Print-On-Demand):	979-8-3315-1292-7
ISBN (Online):	979-8-3315-1291-0

**Additional Copies of This Publication Are Available From:**

Curran Associates, Inc  
57 Morehouse Lane  
Red Hook, NY 12571 USA  
Phone: (845) 758-0400  
Fax: (845) 758-2633  
E-mail: [curran@proceedings.com](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

CURRAN ASSOCIATES INC.  
**proceedings**  
.com



## TABLE OF CONTENTS

### Session 1

<b>A New Approach to Street Lighting Design Through LED Technology and Optical System Optimization</b> .....	01
<i>Anastasios Dimitrakis, Evangelos-Nikolaos Madias, Athanasios Kotsenos, Frangiskos Topalis, Greece</i>	
<b>Lighting Design for Industry 5.0 and the New Bauhaus: Additive Manufacturing of Luminaires</b> .....	07
<i>Alexios Papacharalampopoulos, Panagiotis Stavropoulos, Greece</i>	
<b>Comparison of LED and Fluorescent Systems in Office Lighting in terms of Energy Savings Depending on Daylight and Occupancy Conditions</b> .....	13
<i>Osman Demirezer, Ayetül Gelen, Türkiye</i>	
<b>C-Plane Angular Interval Optimization for Accurate Photometric Measurement of LED Luminaires with Various Light Distributions</b> .....	19
<i>Milko Yovchev, Plamen Tsankov, Hristo Ibrishimov, Ivaylo Stoyanov, Bulgaria</i>	
<b>Colorimetric Measurement of LED Lamps by Different Measurement Setups –Case Study</b> .....	25
<i>Iva Petrinska, Dilyan Ivanov, Bulgaria</i>	
<b>Influence of Color Light on Recovery Process during Physical Activities –Experimental Study</b> .....	31
<i>Kamelia Nikolova, Milcho Uzunov, Alexander Alexandrov, Victor Mutafchiev, Bulgaria</i>	

**Session 2**

<b>Impact of Tilt and Azimuth Angles of the PV Modules on the Performance of a Photovoltaic System</b> .....	36
<i>Ivaylo Lazarov, Plamen Tsankov, Bulgaria</i>	
<b>Modelling of Supercapacitors in EVs</b> .....	43
<i>Valentin Totev, Bulgaria</i>	
<b>Biogas Generation Based on A Mixture of Cow Manure With Citrus Waste and Influence of Bismuth Complexes on Gas Production</b> .....	47
<i>Kamelia Ruskova, Alexander Zahariev, Anelia Tzanova, Tsvetan Marinov, Bulgaria</i>	
<b>Grid-connected Photovoltaic Street Lighting System With Hybrid Inverter and Battery Storage</b> .....	51
<i>Mincho Velkov, Bulgaria</i>	
<b>Methodology of Accurate Current and Voltage Calculations in String Sizing in PV Systems</b> .....	56
<i>Borislav Boychev, Polina Petkova, Bulgaria</i>	
<b>Architectural and Artistic Lighting of the Central Post Office – Sofia: Integration of Light and Cultural Heritage</b> .....	59
<i>Dimitar Pavlov, Cvetomir Stoyanov, Kiril Kassev, Rad Stanev, Kalina Angelova, Bulgaria</i>	

**Session 3**

<b>Analysis of Operating Modes of Lithium-Ion Battery in MATLAB/Simulink Environment</b> .....	65
<i>Emil Rachev, Vladislav Petrov, Gergana Vacheva, Bulgaria</i>	
<b>Assessing the Societal and Cultural Impact of Higher Education – a Survey</b> .....	69
<i>Mariya Ivanova, Paulina Andronova, Denitsa Ivanova-Mutafchieva, Martina Stipchekova, Bulgaria</i>	
<b>Blockchain &amp; Energy Trading</b> .....	74
<i>Mohammad Hamid Sarwary, Afghanistan</i>	
<b>Color Changing Mechanisms of Cephalopods Used in Developing Color Changing Materials</b> .....	82
<i>Kazim Hilmi Or, Türkiye</i>	
<b>Correction of Colorimetric Measurement by Means of Color Filters– Case Study</b> .....	86
<i>Iva Petrinska, Dilyan Ivanov, Bulgaria</i>	

**Session 4**

<b>Study of the Interconnect Defects on the Total Power for CMOS Inverter</b> .....	91
<i>Abdelaziz Lazzaz, Khaled Bousbahi, Mustapha Ghamnia, Algeria</i>	
<b>Control and Mitigation of Stray Currents in Urban Tram Transport Systems</b> .....	95
<i>Polina Petkova, Ivan Angelov, Martina Tomcheva, Petar Stefanov, Bulgaria</i>	
<b>Comparative Study of the Electrical Parameters of Modern Lighting Systems in Railway Infrastructure</b> .....	98
<i>Orlin Petrov, Angel Musev, Sadetin Basri, Bulgaria</i>	
<b>Analysis of the Electrical Parameters of Modern Lighting Systems in Railway Infrastructure</b> .....	104
<i>Orlin Petrov, Sadetin Basri, Evgeni Enchev, Bulgaria</i>	
<b>Intelligent Greenhouse Emitter Control System</b> .....	110
<i>Veselin Valkov, Bulgaria</i>	
<b>Architectural Lighting Design of the Building 1 of the Technical University of Sofia</b> .....	115
<i>Magdalena Filipova, Vasilena Kisyova, Teodora Todorova, Yordanka Dincheva, Natalia Georgieva, Bulgaria</i>	

**Session 5**

<b>Analysis and Modeling of Ferroresonant Overvoltage in Electric Grids</b> .....	119
<i>Hristo Ilchev, Bulgaria</i>	
<b>Induced Voltage in a Disconnected Grounded Conductor of a Three-Phase Electric Power Line</b> .....	123
<i>Hristo Ilchev, Bulgaria</i>	
<b>Variant Study for Selecting a Storage Battery for a Photovoltaic System</b> .....	127
<i>Petya Tsvetkova, Mladen Mladenov, Bulgaria</i>	
<b>Increasing the Accuracy of Short-Term Planning in Electricity Distribution Networks</b> .....	131
<i>Petya Tsvetkova, Bulgaria</i>	
<b>Analysis of the Electrical Loads of Household Consumers with Electric Heating</b> .....	135
<i>Petya Tsvetkova, Bulgaria</i>	

**Session 6**

<b>Study and Analysis of Energy Efficiency of a Photovoltaic Laboratory in Winter Season</b> .....	139
<i>Martina Tomcheva, Lyubomir Sekulov, Galina Cherneva, Bulgaria</i>	
<b>Reliability Assessment of Buck DC-DC Converter</b> .....	144
<i>Gergana Vacheva, Plamen Stanchev, Nikolay Hinov, Bulgaria</i>	
<b>Sensitivity Analysis of ZETA DC-DC Converter Under Inductance Variation</b> .....	148

Gergana Vacheva, Plamen Stanchev, Nikolay Hinov, *Bulgaria*

**Field Oriented Control of an Induction Motor Considering the Magnetic Circuit Saturation** ..... 153

Emil Rachev, Vladislav Petrov, Gergana Vacheva, *Bulgaria*

**The Effect of Artificial Lighting Spectrum on Students' Concentration** ..... 158

Iulian Gherasim, *Romania*

**System for Monitoring Artificial Lighting at Road Junctions and Tunnels** ..... 168

Angel Pachamanov, Kamen Georgiev, Dimitar Pavlov, Marin Dimitrov,  
Atanas Kolev, Stephanie Ivanova, Kiril Kassev, Nadya Radeva, *Bulgaria*

**Energy-efficient Lighting Control in Road Tunnels** ..... 175

Angel Pachamanov, Kamen Georgiev, Marin Dimitrov, Atanas Kolev, Dimitar Pavlov, *Bulgaria*

**Performance Assessment of Vertical Oriented PV Modules on a Fence Structure** ..... 178

Plamen Stanchev, Gergana Vacheva, Nikolay Hinov, *Bulgaria*

**Cost-Effective and Low-Carbon Energy Optimization in SMEs  
via Smart Control of Heat Pumps and Thermal Storage under PV Generation** ..... 182

Plamen Stanchev, *Bulgaria*

**Efficiency Assessment of a PV Plant with a Storage Element for a Holiday House** ..... 187

Plamen Stanchev, Ivelina Hinova, *Bulgaria*

**Mechanical Loss Determination for High Speed Induction Motor Drives  
Based on Mechanical Oscillation Analysis** ..... 192

Emil Rachev, Vladislav Petrov, Gergana Vacheva, *Bulgaria*

**Low-light Orienteering** ..... 196

Alexander Alexandrov, *Bulgaria*

**Exploring the Efficiency of Using “Time - Out” In Table Tennis** ..... 200

Milcho Uzunov, *Bulgaria*

**Representation with an Index Matrix which elements are Distribution function values  
read by Arduino Uno and Photoresistor** ..... 203

Stela Todorova, *Bulgaria*