



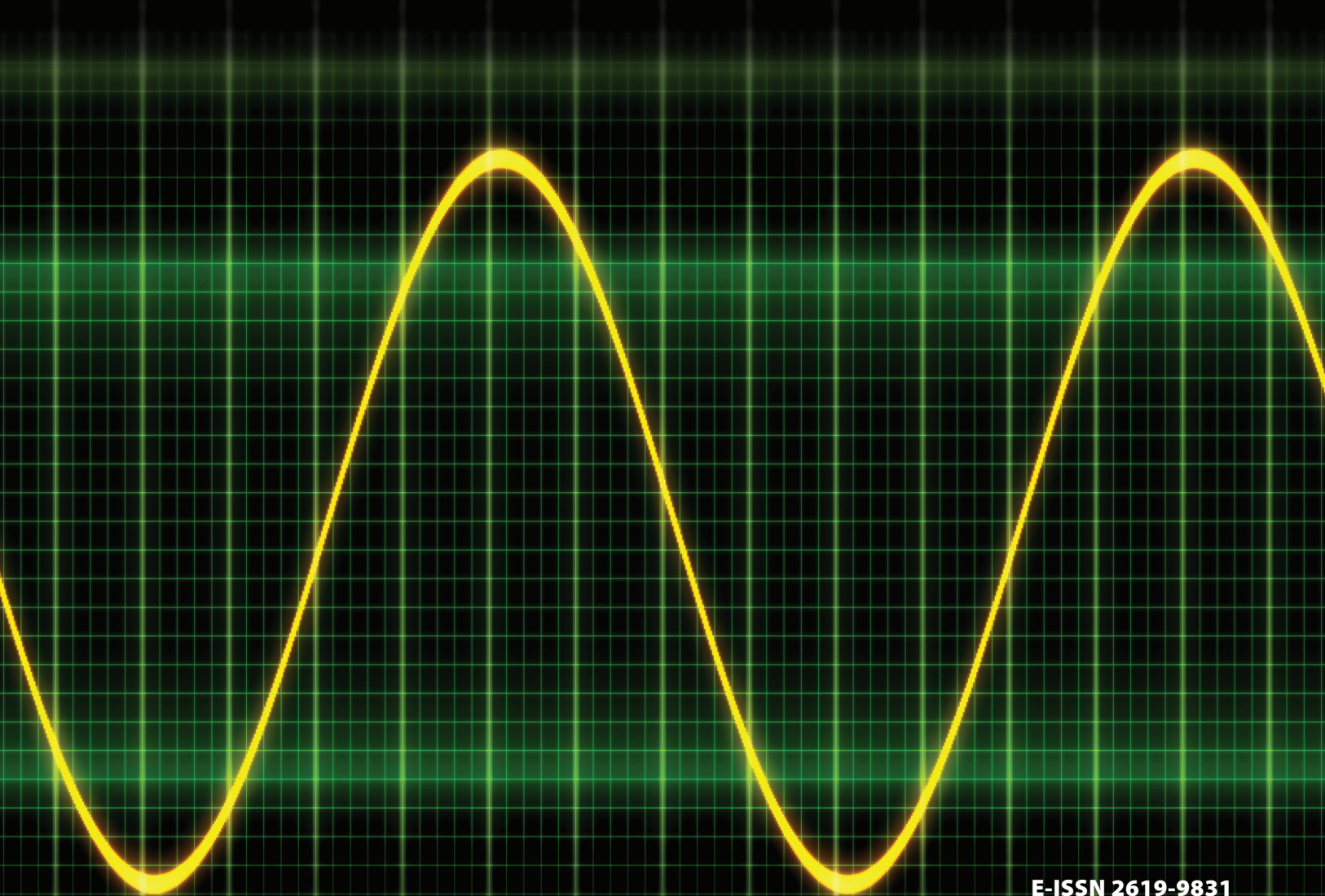
İSTANBUL UNIVERSITY
C E R R A H P A Ş A



ELECTRICA

electricajournal.org

Official journal of İstanbul University-Cerrahpaşa Faculty of Engineering



E-ISSN 2619-9831



VOLUME 23 » ISSUE 1 » January 2023

Editorial Board

Editor in Chief

Firat KAÇAR

Department of Electrical-Electronics, Istanbul University - Cerrahpaşa Faculty of Engineering, Istanbul, Turkey

Associate Editors

Aysel ERSOY

Department of Electrical-Electronics, Istanbul University - Cerrahpaşa Faculty of Engineering, Istanbul, Turkey

Guest Editor

Ashtosh SHARMA

Institute of Computer Technology and Information Security, Southern Federal University, Russia

Cengiz Polat UZUNOĞLU

Department of Electrical-Electronics, Istanbul University - Cerrahpaşa Faculty of Engineering, Istanbul, Turkey

Piotr GAS

Department of Electrical and Power Engineering, AGH University of Science and Technology, Faculty of Electrical Engineering, Automatics, Computer Science and Biomedical Engineering, Krakow, Poland

Yogendra ARYA

Department of Electrical Engineering, J.C. Bose University of Science and Technology, YMCA, Faridabad, Haryana, India

Assistant Editor

Abdurrahim AKGÜNDOĞDU

Department of Electrical-Electronics, Istanbul University - Cerrahpaşa Faculty of Engineering, Istanbul, Turkey

Advisory Board

Aydın AKAN

Department of Electrical-Electronics, İzmir Ekonomi University, İzmir, Turkey

Aysen B. ARSOY

Department of Electrical-Electronics, Kocaeli University Faculty of Engineering, Kocaeli, Turkey

Alinur BUYUKAKSOY

Department of Electrical-Electronics, Okan University Faculty of Engineering, Istanbul, Turkey

Luis F. CHAPARRLO

Department of Electrical Engineering, University of Pittsburg, Pittsburgh, USA

Oğuzhan ÇİÇEKOĞLU

Department of Electrical Engineering, Boğaziçi University Faculty of Engineering, Istanbul, Turkey

Gregory M. DIMIROVSKI

SSC. and Methodius University, Skopje, Macedonia

Emrah DOKUR

Department of Electrical-Electronics, Bilecik Şeyh Edebali University Faculty of Engineering, Bilecik, Turkey

Alain FABRE

IMS-ENSEIRB, Bordeaux, France

I. Cem GÖKNAR

Department of Electrical and Electronics Engineering, Doguş University Faculty of Engineering, Istanbul, Turkey

Rachid HARBA

LESI, France

Hüseyin HIZIROĞLU

Department of Electrical and Electronics Engineering, Kattering University Faculty of Engineering, Michigan, USA

Nihat KABAOĞLU

Department of Electrical and Electronics Engineering, İstanbul Medeniyet University Faculty of Engineering and Natural Sciences, İstanbul, Turkey

Özcan KALENDERLİ

Department of Electrical and Electronics Engineering, İstanbul Technical University Faculty of Electrical-Electronic, İstanbul, Turkey

Mukden UĞUR

Department of Electrical and Electronics Engineering, Türk-Alman University, İstanbul, Turkey

Hülya KIRKICI

Department of Electrical and Computer Engineering, Auburn University, Auburn, USA

Ayten KUNTMAN

Emeritus, Istanbul University-Cerrahpaşa, Cerrahpaşa Faculty of Medicine, Istanbul, Turkey

Hakan KUNTMAN

Emeritus, İstanbul, İstanbul Technical University Faculty of Electrical-Electronic, İstanbul, Turkey

Mehmet KURBAN

Department of Electrical-Electronics, Bilecik Şeyh Edebali University, Faculty of Engineering, Bilecik, Turkey

Bilgin METİN

Department of Electrical-Electronics, Boğaziçi University Faculty of Engineering, Istanbul, Turkey

Onur OSMAN

Department of Electrical-Electronics, İstanbul Arel University Faculty of Engineering, İstanbul, Turkey

Emel ÖNAL

Department of Electrical-Electronics, İstanbul Technical University Faculty of Electrical-Electronic, İstanbul, Turkey

Raj, SENANI

Department of Electrical-Electronics, NSIT University Electronics and Communications Engineering, Delhi, India

Ahmet SERTBAŞ

Department of Computer Engineering, Istanbul University-Cerrahpaşa, Cerrahpaşa Faculty of Engineering, Istanbul, Turkey

Metin ŞENGÜL

Department of Electrical and Electronics Engineering, Kadir Has University Faculty of Engineering and Natural Sciences, İstanbul, Turkey

Vedat TAVŞANOĞLU

Department of Electrical and Electronics Engineering, Işık

University Faculty of Engineering, İstanbul, Turkey

Michail TSATSANIS

Voya Technology Institute, USA

B. Emre TÜRKAY

Department of Electrical Engineering, İstanbul Technical University Faculty of Electrical-Electronic, İstanbul, Turkey

Osman N. UÇAN

Department of Electrical and Electronics Engineering, Kemerburgaz University Faculty of Engineering and Natural Sciences, İstanbul, Turkey

Gökhan UZGÖREN

Department of Electrical and Electronics Engineering, Gedik University Faculty of Engineering, İstanbul, Turkey

Reyat YILMAZ

Department of Electrical and Electronics Engineering, Dokuz Eylül University Faculty of Engineering, İzmir, Turkey

Web Coordinator

Ertuğrul ADIGÜZEL

Department of Electrical-Electronics, İstanbul University - Cerrahpaşa School of Engineering, İstanbul, Turkey



Founder
İbrahim Kara

General Manager
Ali Şahin

Publishing Directors
İrem Soysal
Gökhan Çimen

Editor
Bahar Albayrak

Publications Coordinators
Arzu Arı
Deniz Kaya
İrmak Berberoğlu
Alara Ergin

Hira Gizem Fidan
Vuslat Taş
İrem Özmen

Web Coordinators
Sinem Fehime Koz
Doğan Oruç

Finance Coordinator
Elif Yıldız Çelik

Contact
Address: Büyükdere Street
No: 105/9 34394
Mecidiyekoy, Sisli, İstanbul,
TURKEY
Phone: +90 212 217 17 00
E-mail : info@avesyayincilik.com

Aims and Scope

Electrica is an international, scientific, open access periodical published in accordance with independent, unbiased, and double-blinded peer-review principles. The journal is the official online-only publication of İstanbul University-Cerrahpaşa Faculty of Engineering, and it is published tri-annually on January, May, and September. The publication language of the journal is English.

Electrica aims to contribute to the literature by publishing manuscripts at the highest scientific level on all fields of electrical and electronics engineering. The journal publishes original research and review articles that are prepared in accordance with ethical guidelines.

The scope of the journal includes but not limited to; electronics, microwave, transmission, control systems, electrical machines, energy transmission and high voltage.

The target audience of the journal includes specialists and professionals working and interested in all disciplines of electrical and electronics engineering.

The editorial and publication processes of the journal are shaped in accordance with the guidelines of the Institute of Electrical and Electronics Engineers (IEEE), the World Commission on the Ethics of Scientific Knowledge and Technology (COMEST), Council of Science Editors (CSE), Committee on Publication Ethics (COPE), European Association of Science Editors (EASE), and National Information Standards Organization (NISO). The journal is in conformity with the Principles of Transparency and Best Practice in Scholarly Publishing (doaj.org/bestpractice).

The journal is currently indexed in Web of Science- Emerging Sources Citation Index, Scopus, DOAJ, Compendex, Gale, EBSCO, China National Knowledge Infrastructure (CNKI) and TUBITAK ULAKBIM TR Index.

All expenses of the journal are covered by İstanbul University-Cerrahpaşa. Processing and publication are free of charge with the journal. No fees are requested from the authors at any point throughout the evaluation and publication process. All manuscripts must be submitted via the online submission system, which is available at electricajournal.org. The journal guidelines, technical information, and the required forms are available on the journal's web page.

Statements or opinions expressed in the manuscripts published in the journal reflect the views of the author(s) and not the opinions of the Electrica editors, editorial board, and/or publisher; the editors, editorial board, and publisher disclaim any responsibility or liability for such materials.

Electrica is an open access publication and the journal's publication model is based on Budapest Open Access Initiative (BOAI) declaration. Journal's archive is available online, free of charge at electricajournal.org. Electrica's content is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

You can find the current version of the Instructions to Authors at <https://electricajournal.org/>.



Editor in Chief : Fırat KAÇAR
Address : Department of Electrical-Electronics, İstanbul University - Cerrahpaşa Faculty of Engineering, Avclar, İstanbul, Turkey
Phone : +90 212 473 7070
Fax : +90 212 473 7064
E-mail : fkacar@iuc.edu.tr

Publisher : İstanbul University-Cerrahpaşa
Address : Üniversite Mahallesi, Bağlariçi Caddesi No: 7, İstanbul, Turkey

Publishing Service : AVES
Address : Büyükdere Caddesi, 105/9 34394 Şişli, İstanbul, Turkey
Phone : +90 212 217 17 00
E-mail : info@avesyayincilik.com
Web page : www.avesyayincilik.com

Contents

1 Acknowledgement of Reviewers

ORIGINAL ARTICLES

- 3 **Implementation of DBSCAN Method in Star Trackers to Improve Image Segmentation in Heavy Noise Conditions**
Nevsan Şengil
- 11 **Experimental-Base Analysis of the Effect of Adding PM Disc to the Hysteresis Motor Under Steady-State Conditions**
Ali Behniafar
- 20 **An Indirect PI-MPC Hybrid Method-Based Bi-quasi-Modified Switched Z Source Inverters for Vehicle to Grid applications**
Anish Tiwari, Anandita Chowdhury
- 28 **Hybridization and Power Control of an Isolated PV-SEIG-based Generation System Using novel Nine Switch Converter**
Abhijeet Choudhury, Swagat Pati, Sanjeeb Kumar Kar, Renu Sharma
- 40 **A Comparative Study on Energy Harvesting Battery-Free LoRaWAN Sensor Networks**
Cengiz Riva, Abdul Halim Zaim
- 48 **Modelling, Validation, and Simulation of Solar Photovoltaic Modules**
Alhassan Ali Teyabeen, Ali Elseddig Jwaid
- 61 **Design of Infant Incubator Analyzer**
Ahmed Sallam, Manâ Sezdi
- 70 **A Novel Approach to Noise Reduction in IIoT Environment Using MCU**
Sadeq Othman Al-Hamouz
- 79 **Research on Improving the Inspection Efficiency of Substation Based on Big Data Analysis**
Zhenzhen Zhou, Yunhai Song, Haohui Su, Jianing Shang, Zhengyang Luo, Qi Wang
- 87 **Vector-Controlled Permanent Magnet Synchronous Motor Drive with Reduced Current Sensor**
Sai Shiva Badini, Vimlesh Verma
- 95 **Selection of Input–Output Pairing and Control Structure Configuration Using Interaction Measures for DC–DC Dual Input Zeta-SEPIC Converter**
Phanindra Thota, Amarendra Reddy Bhimavarapu, V V S Bhaskara Reddy Chintapalli
- 107 **Temperature Field and Power Loss Calculation With Coupled Simulations for a Medium-Voltage Simplified Switchgear**
Ahmet Efe Şeker, Bayram Çelik, Deniz Yıldırım, Egemen Aslan Sakacı, Arif Deniz
- 121 **Comparison of FEA-Based Thermal and Loss Analyses of the Dry-Type Transformer Using Different Grades of Core Material**
Seda Kul, Süleyman Sungur Tezcan
- 129 **Effects of Memristor on Oscillator and Regulator Circuits**
Sevgi Gürsul, Serdar Ethem Hamamcı

REVIEW

- 137 **A Comparative Analysis of Solar Photovoltaic Advanced Fault Detection and Monitoring Techniques**
Siti Nor Azlina Mohd Ghazali, Muhamad Zahim Sujod
- 149 **Erratum**
- 150 **Erratum**