

EAEIE 2022

Proceedings of the
2022 31st Annual Conference of the European Association for Education in Electrical and Information Engineering (EAEIE)

Editors: Fernando Lopes, Inácio Fonseca

Each paper has been reviewed. The responsibility for the content and language of each paper rests solely on its author(s).

First edition, 2022

ISBN: 978-1-6654-8441-1 (USB) [ISBN 978-1-6654-8442-8 (IEEE Compliant) | ISSN: 2472-7687]

IEEE Catalog Number: CFP2296D-USB (USB) [CFP2296D-ART (IEEE Compliant)]

EAEIE 2022 is organized by:

Coimbra Institute of Engineering in Coimbra, Polytechnic of Coimbra

Department of Electrical Engineering

Collaboration: Department of Informatics and Systems Engineering

Technical sponsor:

IEEE Portugal Section, IEEE Portugal Section Education Chapter

Technical support, inquiries and additional copies, contact:

Fernando Lopes

Instituto Superior de Engenharia de Coimbra

DEE - Departamento de Engenharia Eletrotécnica

Rua Pedro Nunes

Quinta da Nora

3030-199 COIMBRA

Portugal

Phone: +351 239 790 200

e-mail: flopes@isec.pt

<https://www.isec.pt/>

Copyright ©2022 by the Institute of Electrical and Electronics Engineers, Inc. All rights reserved.

Copyright and Reprint Permission: 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 that the per-copy fee indicated in the code is paid through the Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923. For reprint or republication permission, email to IEEE Copyrights Manager at pubs-permissions@ieee.org. All rights reserved. Copyright ©2022 by IEEE.