2019 IEEE 5th International Forum on Research and Technology for Society and Industry (RTSI 2019)

Florence, Italy 9 – 12 September 2019



IEEE Catalog Number: ISBN:

CFP19C29-POD 978-1-7281-3816-9

Copyright © 2019 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:	CFP19C29-POD
ISBN (Print-On-Demand):	978-1-7281-3816-9
ISBN (Online):	978-1-7281-3815-2
ISSN:	2687-6809

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 Web: www.proceedings.com



TECHNICAL PROGRAM

Monday, September 9

Power Systems and Smart Grids - Part 1

Room: Auditorium, Centro Didattico Morgagni **Chair:** Samuele Grillo, Polytechnic University of Milan

- 1 Fast Taylor Weighted Least Squares Algorithm for Synchrophasor Estimation Daniel Belega, University Politehnica Timișoara, Romania Dario Petri, University of Trento, Italy
- 6 Conventional Power Plants to TSO Frequency Containment Reserves A Competitive Analysis for Virtual Power Plant's Role

Jibran Ali, University of Genoa, Italy Federico Silvestro, University of Genoa, Italy

12 A New Approach to Determine the Optimal Number and Arrangement of Power Quality Monitors for Voltage Sag Detection

Raif Aličiĉ, EPBIH, Bosnia-Erzegovina Senad Smaka, University of Sarajevo, Bosnia-Erzegovina

18 Statistical Analysis of Lightning-Induced Voltages in Case of Linearly Rising Channel-Base Currents and Lossy Ground

Amedeo Andreotti, University of Naples Federico II, Italy Fabio Mottola, University of Naples Federico II, Italy Antonio Pierno, University of Naples Federico II, Italy Daniela Proto, University of Naples Federico II, Italy

Special Session - Remote sensing methods and applications for a sustainable development Part 1

Room: 013, Centro Didattico Morgagni Chair: Antonio Iodice, University of Naples Federico II Ferdinando Nunziata, University of Naples Federico II

24 PolSAR observation of mangroves using the polarimetric matched filter

Ferdinando Nunziata, Università di Napoli Parthenope, Italy Emanuele Ferrentino, Università di Napoli Parthenope, Italy Hongsheng Zhang, University of Hong Kong, China Maurizio Migliaccio, Università di Napoli Parthenope, Italy

28 Analysis of local- and non-local filters for multi-polarization SAR coastline extraction applications

Angelo Urciuoli, Università di Napoli Parthenope, Italy Andrea Buono, Università di Napoli Parthenope, Italy Ferdinando Nunziata, Università di Napoli Parthenope, Italy Maurizio Migliaccio, Università di Napoli Parthenope, Italy

34 Closed-form Polarimetric Two-Scale Model for sea scattering evaluation

Gerardo Di Martino, University of Naples, "Federico II", Italy Alessio Di Simone, University of Naples, "Federico II", Italy Antonio Iodice, University of Naples, "Federico II", Italy Daniele Riccio, University of Naples, "Federico II", Italy

39 HAEMS: Implementation of an Intelligent Event-Driven Edge Mesh IoT Architecture

Michael Rescati, University of Milan, Italy Emanuela Scapini, University of Milan, Italy Marcello DeMatteis, University of Milan, Italy Raimondo Schettini, University of Milan, Italy Danilo Pau, STMicroelectronics, Italy Marco Paganoni, University of Milan, Italy Andrea Baschirotto, University of Milan, Italy

45 Environmental Intelligence for Embedded Real-time Traffic Sound Classification

Pietro Montino, Bluewind Srl, Italy Danilo Pau, STMicroelectronics, Italy

Automation, Robotics and Smart Factories

Room: 014, Centro Didattico Morgagni **Chair:** Massimo Macucci, University of Pisa

51 The Human Being at the Center of Smart Factories Thanks to Augmented Reality

Alessandro Luchetti, University of Trento, Italy Paolo Tomasin, University of Trento, Italy Alberto Fornaser, University of Trento, Italy Paolo Tallarico, Fly SpA, Italy Paolo Bosetti, University of Trento, Italy Mariolino De Cecco, University of Trento, Italy

57 Camera-based Occlusion Detection for Banknote Sorting

Eugen Gillich, GmbH Lemgo, Germany Alexander Fritze, Tech. Hochschule Ostwestfalen-Lippe, Germany Kai-Fabian Henning, Tech. Hochschule Ostwestfalen-Lippe, Germany Anton Pfeifer, Tech. Hochschule Ostwestfalen-Lippe, Germany Helene Dorksen, Tech. Hochschule Ostwestfalen-Lippe, Germany Volker Lohweg, Tech. Hochschule Ostwestfalen-Lippe, Germany

63 The Unmanned Chemical Lab (UCL)

Valerio Grassi, Atlas Advanced Technologies srl, Italy Daniele Frigerio, REYS SpA, Italy Alberto Sanzo, REYS SpA, Italy Viola Brioschi, REYS SpA, Italy Andrea Franzolini, REYS SpA, Italy Marco Mauri, REYS SpA, Italy Mario Nespoli, REYS SpA, Italy

67 I-READ 4.0: Internet-of-READers for an efficient asset management in large warehouses with high stock rotation index

Paolo Nepa, University of Pisa, Italy Andrea Motroni, University of Pisa, Italy Antonio Congi, Sofidel S.p.A., Italy Enza Maria Ferro, Sofidel S.p.A., Italy Mario Pesi, Sofidel S.p.A., Italy Giovanni Giorgi, Sofidel S.p.A., Italy Alice Buffi, University of Pisa, Italy Marco Lazzarotti, Ingegneria dei Sistemi Elettronici, Italy Jacopo Bellucci, Ingegneria dei Sistemi Elettronici, Italy Simone Galigani, Ingegneria dei Sistemi Elettronici, Italy Marco Frosolini, University of Pisa, Italy Marcello Braglia, University of Pisa, Italy Adriano Bigongiari, CAEN RFID srl, Italy Gabriele Isola, CAEN RFID srl, Italy Fabrizio Bertuccelli, CAEN RFID srl, Italy Maria Grazia Scutellà, University of Pisa, Italy Massimo Pappalardo, University of Pisa, Italy Mauro Passacantando, Università di Pisa, Italy Domenico Loschiavo, THREElogic MK srl, Italy Alessandro Rubichi, THREElogic MK srl, Italy Claudio Salvador, Advanced Microwave Engineering, Italy Filippo Bonifacio, Advanced Microwave Engineering, Italy Filippo Zani, Advanced Microwave Engineering, Italy

73 Cyber-Physical Production Systems supported by Intelligent Devices (SmartBoxes) for Industrial Processes Digitalization

Pedro Torres, Instituto Politecnico de Castelo Branco, Portugal Rogerio Dionisio, Instituto Politecnico de Castelo Branco, Portugal Sérgio Malhão, Instituto Politecnico de Castelo Branco, Portugal Luís Neto, Universidade do Porto, Portugal Ricardo Ferreira, INL - International Iberian Nanotechnology Laboratory, Portugal Helena Gouveia, ISQ - Instituto de Soldadura e Qualidade, Portugal Hélder Castro, ISQ - Instituto de Soldadura e Qualidade, Portugal

Power Systems and Smart Grids - Part 2

Room: 007, Centro Didattico Morgagni **Chair:** Sasa Djokic, University of Edinburgh

79 Impact of Demand Response Control Logic on Isolated Island's Distribution Networks

Marina Bonomolo, University of Palermo, Italy Mariano Giuseppe Ippolito, Università di Palermo, Italy Giuliana Leone, Università degli Studi di Palermo, Italy Rossano Musca, University of Palermo, Italy Gaetano Zizzo, University of Palermo, Italy Biagio Di Pietra, ENEA, Italy Francesco Monteleone, ENEA, Italy

85 Condition-based Maintenance for Oil&Gas system basing on Failure Modes and Effects Analysis

Lorenzo Ciani, University of Florence, Italy Giulia Guidi, University of Florence, Italy Gabriele Patrizi, University of Florence, Italy

91 Experimental characterization of a micro-turbine generator for energy recovery applications

Tommaso Bacci, University of Florence, Italy Francesco Grasso, University of Florence, Italy Alessio Picchi, University of Florence, Italy Bruno Facchini, University of Florence, Italy Francesco Stortiero, GFM, Italy Giambattista Castelli, GFM, Italy

97 Algorithm for Optimal Microgrid Operation and Control with Adaptable Constraints and Flexible Objective Function

Stefano Massucco, University of Genova and IEES Lab., Italy Paola Pongiglione, University of Genova, Italy Matteo Saviozzi, University of Genova, Italy Federico Silvestro, University of Genova, Italy Pablo Almaleck, ABB, Italy Pietro Serra, ABB, Italy

103 Grid-Tie and Off-Grid Operations for an Innovative Microgrid Realized in Leonardo Campus of Politecnico di Milano

Maurizio Delfanti, Politecnico di Milano, Italy Alessandro Blaco, Politecnico di Milano, Italy Filippo Bovera, Politecnico di Milano, Italy Mauro Pozzi, Politecnico di Milano, Italy Giuliana Invernizzi, Scweitzer Engineering Laboratories, Italy Giorgio Vielmini, Schweitzer Engineering Laboratories, Italy Matteo Moncecchi, Politecnico di Milano, Italy Giuliano Rancilio, Politecnico di Milano, Italy Davide Falabretti, Politecnico di Milano, Italy Ramin Komaie, Politecnico di Milano, Italy Marco Merlo, Politecnico di Milano, Italy

Special Session - Remote sensing methods and applications for a sustainable development - Part 2

Room: 013, Centro Didattico Morgagni Chair: Antonio Iodice, University of Naples Federico II Ferdinando Nunziata, University of Naples Federico II

109 Ship Detection using GNSS-R delay-Doppler Maps via simulation tools

Alessio Di Simone, University of Naples "Federico II", Italy Antonio Iodice, University of Naples "Federico II", Italy Daniele Riccio, University of Naples "Federico II", Italy Paolo Braca, NATO STO CMRE, Italy Leonardo Maria Millefiori, NATO STO CMRE, Italy Tiziana Beltramonte, University of Sannio, Italy Carmela Galdi, University of Sannio, Italy Maurizio di Bisceglie, University of Sannio, Italy Peter Willett, University of Connecticut, USA

115 Remote sensing of inland waters with signals of opportunity from Global Navigation Satellite Systems

Tiziana Beltramonte, University of Sannio, Italy Maurizio di Bisceglie, University of Sannio, Italy Carmela Galdi, University of Sannio, Italy Ilaria Mara Russo, University of Sannio, Italy

120 The use of NL paradigm in SAR applications

Hossein Aghababaee, Università di Napoli Parthenope, Italy Bilel Kanoun, Università di Napoli Parthenope, Italy Sergio Vitale, Università di Napoli Parthenope, Italy Giampaolo Ferraioli, Università di Napoli Parthenope, Italy 124 Active fire detection in multispectral super-resolved Sentinel-2 images by means of SAM-based approach

Domenico Dell'Aglio, University of Naples Federico II, Italy Massimiliano Gargiulo, University of Naples Federico II, Italy Antonio Iodice, University of Naples Federico II, Italy Daniele Riccio, University of Naples Federico II, Italy Giuseppe Ruello, University of Naples Federico II, Italy

128 A novel method to improve the spatial resolution of microwave radiometer measurements using variable exponent Lebesgue space

Matteo Alparone, Università di Napoli Parthenope, Italy Ferdinando Nunziata, Universit'a di Napoli Parthenope, Italy Claudio Estatico, University of Genoa, Italy Maurizio Migliaccio, Università di Napoli Parthenope, Italy

Big Data, Cybersecurity, Logistics and Human Mobility

Room: 014, Centro Didattico Morgagni **Chair:** Lorenzo Mucchi, University of Florence, Italy

132 On the trade-off between Secrecy and Energy-Efficiency in Multi-layer Cellular Networks

Simone Morosi, University of Florence, Italy Lorenzo Mucchi, University of Florence, Italy Dania Marabissi, University of Florence, Italy Marco Dolfi, University of Florence, Italy Katiuscia Marini, University of Florence, Italy

138 Fog Acceleration through Reconfigurable Devices Samuele Barbieri, Politecnico di Milano, Italy Fabiola Casasopra, Politecnico di Milano, Italy Rolando Brondolin, Politecnico di Milano, Italy Marco D. Santambrogio, Politecnico di Milano, Italy

144 Solving write conflicts in GPU-accelerated graph computation: a PageRank case-study

Diego Piccinotti, Politecnico di Milano, Italy Edoardo Ramalli, Politecnico di Milano, Italy Alberto Parravicini, Politecnico di Milano, Italy Rolando Brondolin, Politecnico di Milano, Italy Marco Santambrogio, Politecnico di Milano, Italy

149 Optimally Scheduling Complex Logistics Operations Involving Acquisition, Elaboration and Action Tasks Lohic Fotio Tiotsop, Politecnico di Torino, Italy Antonio Servetti, Politecnico di Torino, Italy Enrico Masala, Politecnico di Torino, Italy

155 Detection of Points of Interest in a Smart Campus Alessandra De Paola, University of Palermo, Italy Andrea Giammanco, University of Palermo, Italy Giuseppe Lo Re, University of Palermo, Italy Giuseppe Anastasi, University of Pisa, Italy

Tuesday September 10

Special Session - Advances in Soft Computing and Numerical Techniques for Optimization, Inverse Problems and Non-Destructive Testing

Room: 007, Centro Didattico Morgagni Chair: Gabriele Maria Lozito, Università degli Studi Roma Tre

161 Smart Acoustic Sensor

Jakub Svatos, Czech Technical University in Prague, Czechia Jan Holub, Czech Technical University in Prague, Czechia

166 Electromagnetic Full-Wave Simulation of Partial Discharge Detection in High Voltage AC Cables

Graziella Giglia, University of Palermo, Italy Guido Ala, University of Palermo, Italy Vincenzo Castiglia, University of Palermo, Italy Antonino Imburgia, University of Palermo, Italy Rosario Miceli, University of Palermo, Italy Giuseppe Rizzo, University of Palermo, Italy Pietro Romano, University of Palermo, Italy Giuseppe Schettino, University of Palermo, Italy Fabio Viola, University of Palermo, Italy

172 **Optimal Homogeneous Transmission Line Model for Graphene Interconnects** Antonio Maffucci, University of Cassino and Southern Lazio, Italy Antonello Tamburrino, University of Cassino and Southern Lazio, Italy Salvatore Ventre, University of Cassino and Southern Lazio, Italy

- 176 A neural-FEM approach for the effective permeability estimation of a composite magnetic shielding mortar Salvatore Coco, University of Catania, Italy Antonino Laudani, Roma Tre University
- 182 **Optimum Identification of Iron Loss Models in NGO Electrical Steel for Power Electronics** Simone Quondam Antonio, University of Perugia, Italy
- 188 Comparative Evaluation and Simulation of Current Control Methods of LLC Converters in EV Battery Chargers

Matteo Gregorio, DENERG, Politecnico di Torino, Italy Fabio Mandrile, DENERG, Politecnico di Torino Salvatore Musumeci, DENERG, Politecnico di Torino

- 194 Preisach model identification for the prediction of static hysteresis loops in ferrite cores Hari Prasad Rimal, University of Perugia, Italy Simone Quondam Antonio, University of Perugia, Italy Abdelrahman Mohamed Ghanim, University of Perugia, Italy
- N/A Convolutional Neural Networks architecture for complex simulations: a mixed analogue-digital approach Fausto Sargeni, University of Rome "Tor Vergata", Italy Vincenzo Bonaiuto, University of Rome "Tor Vergata", Italy

Renewable Energy and Energy Storage Systems

Room: 013, Centro Didattico Morgagni **Chair:** Gaetano Zizzo, University of Palermo

202 Optimal design of off-grid power systems operated by a rolling-horizon strategy: a method to reduce computational requirements

Davide Fioriti, DESTEC, University of Pisa, Italy Giovanni Lutzemberger, DESTEC, University of Pisa, Italy Davide Poli, DESTEC, University of Pisa, Italy Andrea Micangeli, DIMA, University of Rome "Sapienza", Italy Pablo Duenas-Martinez, MITEI, USA

208 Advanced microstructures for electrochemical energy systems: a modelling perspective

Antonio Bertei, University of Pisa, Italy Roberto Mauri, University of Pisa, Italy Chih-Che Chueh, National Cheng Kung University

213 Planning of Battery Energy Storage Systems accounting for Uncertainties and Degradation Guido Carpinelli, University of Naples Federico II, Italy Fabio Mottola, University of Naples Federico II, Italy Daniela Proto, University of Naples Federico II, Italy

219 Overcharged Li-polymer batteries: a post-mortem analysis

Serena Ciorba, University of Pisa, Italy Claudia Antonetti, University of Pisa, Italy Marco Martinelli, University of Pisa, Italy Anna Maria Raspolli Galletti, University of Pisa, Italy Gianluca Caposciutti, University of Pisa, Italy Mirko Marracci, University of Pisa, Italy Bernardo Tellini, University of Pisa, Italy

225 Modeling and simulation of Constant Phase Element for battery Electrochemical Impedance Spectroscopy

Edoardo Locorotondo, University of Florence, Italy Luca Pugi, University of Florence, Italy Lorenzo Berzi, University of Florence, Italy Marco Pierini, University of Florence, Italy Santo Scavuzzo, Politecnico di Torino, Italy Alessandro Ferraris, Politecnico di Torino, Italy Andrea Giancarlo Airale, Politecnico di Torino, Italy Massimiliana Carello, Politecnico di Torino, Italy

231 Energy Storage System optimization for an Autonomous SailBoat

Enrico Boni, University of Florence, Italy Marco Montagni, University of Florence, Italy Andrea Moreschi, University of Florence, Italy Luca Pugi, University of Florence, Italy

236 PROT-ONE project: a passive solution to increase Li-Ion batteries safety

Francesco Pacini, Leonardo S.p.A., Italy Bruno Tevenè, Leonardo S.p.A., Italy

Special Session - Enhanced modeling, simulation, design and testing of magnetic components and innovative architectures for power converters - Part 1

Room: 014, Centro Didattico Morgagni

Chair: Ermanno Cardelli, Università di Perugia

242 Behavioral models for ferrite-core inductors in switch-mode DC-DC power supplies: a survey

Matteo Lodi, University of Genoa, Italy Alberto Oliveri, University of Genoa, Italy Marco Storace, University of Genoa, Italy

248 Symbolic Techniques in DC-DC Converter Simulation

Francesco Grasso, University of Florence, Italy Antonio Luchetta, University of Florence, Italy Stefano Manetti, University of Florence, Italy Maria Cristina Piccirilli, University of Florence, Italy

254 Impact of Inductors Saturation on DC-DC Switching Regulators Giulia Di Capua, University of Salerno, Italy Nicola Femia, University of Salerno, Italy Kateryna Stoyka, University of Salerno, Italy

- 260 Modelling of magnetic components for power electronics: a circuit equivalent approach Giambattista Gruosso, Politecnico di Milano, Italy
- 265 **Testability Analysis in Neural Network Based Fault Diagnosis of DC-DC Converter** *Igor Aizenberg, Manhattan College, USA Marco Bindi, University of Florence, Italy Francesco Grasso, University of Florence, Italy Antonio Luchetta, University of Florence, Italy Stefano Manetti, University of Florence, Italy Maria Cristina Piccirilli, University of Florence, Italy*

269 Inductor Constraints on LLC Converter Design in Battery Charger Applications Salvatore Musumeci, DENERG, Politecnico di Torino

275 Power Regulation in Inductive Power Transfer via Power Line Communication

Sami Barmada, University of Pisa, Italy Paolo Bolognesi, University of Pisa, Italy Valentina Consolo, University of Pisa, Italy Antonino Musolino, University of Pisa, Italy Rocco Rizzo, University of Pisa, Italy Luca Sani, University of Pisa, Italy Mauro Tucci, University of Pisa, Italy

279 Circular Coil for EV Wireless Charging Design and Optimization Considering Ferrite Saturation

Francesco Grasso, University of Florence, Italy Fabio Corti, University of Florence, Italy Libero Paolucci, University of Florence, Italy Luca Pugi, University of Florence, Italy Leonardo Luchetti, University of Florence, Italy

Complex Systems Modeling

Room: 007, Centro Didattico Morgagni **Chair:** Lorenzo Ciani, University of Florence, Italy

285 Exploring transductive and inductive methods for vertex embedding in biological networks

Luca Giuseppe Cellamare, Politecnico di Milano, Italy Michele Amedeo Bertoldi, Politecnico di Milano, Italy Alberto Parravicini, Politecnico di Milano, Italy Marco D. Santambrogio, Politecnico di Milano, Italy

291 A novel layered approach to evaluate reliability of complex systems

Laura Carnevali, University of Florence, Italy Lorenzo Ciani, University of Florence, Italy Alessandro Fantechi, University of Florence, Italy Marco Papini, University of Florence, Italy

296 Evaluation of alternative battery charging schemes for one-way electric vehicle smart mobility sharing systems based on real urban trip data

Maren Schnieder, Loughborough University, UK Andrew West, Loughborough University, UK

302 Adaptive Network Based Fuzzy Inference System for Frequency Regulation in Modern Maritime Power Systems

Meysam Gheisarnejad, Islamic Azad University, Denmark Mohammad Hassan Khooban, Aalborg, Denmark Jalil Boudjadar, Aarhus University, Denmark

308 Brake Blending Strategy on Electric Vehicle Co-simulation Between MATLAB Simulink and Simcenter Amesim

Lorenzo Berzi, University of Florence, Italy Tommaso Favilli, University of Florence, Italy Marco Pierini, University of Florence, Italy Luca Pugi, University of Florence, Italy Gerhard Benedikt Weiß, VIRTUAL VEHICLE Research Center, Austria Nicola Tobia, Vehicle System Innovation, Italy Matthieu Ponchant, Siemens Industry Software S.A.S., France

Energy Harvesting, Wireless Power Transfer and Power Electronics

Room: 013, Centro Didattico Morgagni **Chair:** Alice Buffi, University of Pisa

314 Study of a vibration-based piezoelectric energy harvester embedded in an air spring

Andrea Genovese, University of Naples Federico II, Italy Salvatore Strano, University of Naples Federico II, Italy Mario Terzo, University of Naples Federico II, Italy

320 Development and optimization of an energy harvesting circuit for multiple piezoelectric elements integrated into a smart air spring

Federico D'Aniello, University of Naples Federico II Michele Riccio, University of Naples Federico II Luca Maresca, University of Naples Federico II Andrea Irace, University of Naples Federico II Giovanni Breglio, University of Naples Federico II Andrea Genovese, University of Naples Federico II Salvatore Strano, University of Naples Federico II Mario Terzo, University of Naples Federico II

325 Wireless charging of batteries for electric boatsg Edoardo Paglialunga, University of Pisa, Italy Paolo Marconcini, University of Pisa, Italy Massimo Macucci, University of Pisa, Italy

331 Analytical Model of Power MOSFET Switching Losses due to Parasitic Components

Edoardo Locorotondo, University of Florence, Italy Luca Pugi, University of Florence, Italy Fabio Corti, University of Florence, Italy Lorenzo Becchi, University of Florence, Italy Francesco Grasso, University of Florence, Italy

Wednesday September 11

Power Management and Smart Building Technologies, Neural networks, Linear and Non-Linear Modeling

Room: 007, Centro Didattico Morgagni **Chair:** Luigi Martirano, University of Rome-La Sapienza

- 337 On the Peak of the Impulse Response of Polytopic LTV Systems Graziano Chesi, The University of Hong Kong, Hong Kong Tiantian Shen, Hunan Normal University, China
- 341 Weather Based Day-Ahead and Week-Ahead Load Forecasting using Deep Recurrent Neural Network Mingzhe Zou, The University of Edinburgh, UK Duo Fang, The University of Edinburgh, UK Gareth Harrison, The University of Edinburgh, UK Sasa Djokic, The University of Edinburgh, UK
- 347 A System based on IoT platforms and Occupancy Monitoring for Energy-efficient HVAC Management Michele Corrà, Tretec S.r.l., Italy Emiliano Fusari, Tretec S.r.l., Italy Alessandro Ferrari, VNG Ingegneria, Italy David Macii, University of Trento, Italy
- 353 Simplified State Space Building Energy Model and Transfer Learning Based Occupancy Estimation for HVAC Optimal Control

Gabriele Mosaico, Università degli Studi di Genova, Italy Matteo Saviozzi, Università degli Studi di Genova, Italy Federico Silvestro, Università degli Studi di Genova, Italy Andrea Bagnasco, IESolutions S.r.l, Italy Andrea Vinci, IESolutions S.r.l, Italy 359 Simulation Model and Experimental Setup for Power Quality Disturbances Methodologies Testing and Validation

Francesco Grasso, University of Florence, Italy Libero Paolucci, University of Florence, Italy Tommaso Bacci, University of Florence, Italy Giacomo Talluri, Università di Firenze, Italy Franco Cenghialta, Energia Europa SpA, Italy Ernesto D'Antuono, Energia Europa SpA, Italy Stefano De Giorgis, Energia Europa SpA, Italy

Wireless Sensor Networks, RFID Localization Technologies, Nanotechnologies, Photonic technologies

Room: 013, Centro Didattico Morgagni Chair: Dania Marabissi, University of Florence, Italy

364 Standby redundancy for reliability improvement of wireless sensor network

Marcantonio Catelani, University of Florence, Italy Lorenzo Ciani, University of Florence, Italy Alessandro Bartolini, University of Florence, Italy Giulia Guidi, University of Florence, Italy Gabriele Patrizi, University of Florence, Italy

- 370 A Novel Phase-based Method for UHF-RFID Tag Localization via UAV Alice Buffi, University of Pisa, Italy Bernardo Tellini, University of Pisa, Italy
- 376 Analysis of shielding effectiveness of cement composites filled with pyrolyzed biochar

Patrizia Savi, Politecnico di Torino, Italy Damiano Cirielli, Politecnico di Torino, Italy Davide di Summa, University of Bergamo, Italy Giuseppe Ruscica, University of Bergamo, Italy Isabella Natali Sora, University of Bergamo, Italy

380 Guidance properties and thermal effects in 9-core Ybdoped fiber for high power applications Seyyedhossein Mckee, University of Parma, Italy Federica Poli, University of Parma, Italy Stefano Selleri, University of Parma, Italy Annamaria Cucinotta, University of Parma, Italy Lorenzo Rosa, University of Modena and Reggio Emilia, Italy Luca Vincetti, University of Modena and Reggio Emilia, Italy

384 Lamb wave-based Cure Monitoring of Carbon Fibre Reinforced Polymers for On-site Aircraft Repairs Christoph-Alexander Holst, Technische Hochschule Ostwestfalen-Lippe, Germany Volker Lohweg, Technische Hochschule Ostwestfalen-Lippe, Germany Kristian Röckemann, OWITA GmbH, Germany

Special Session - Enhanced modeling, simulation, design and testing of magnetic components and innovative architectures for power converters - Part 2

Room: 014, Centro Didattico Morgagni Chair: Simone Quondam Antonio, University of Perugia, Italy

Andreas Steinmetz, OWITA GmbH, Germany

389 Numerical Dynamic Modeling and Analysis of DC-DC Converters for Photovoltaic Applications Antonino Laudani, University of Roma Tre, Italy Gabriele Maria Lozito, Roma Tre University, Italy Francesco Riganti Fulginei, Roma TRE University, Italy Alessandro Salvini, Roma Tre University, Italy

394 Design of Soft Ferrite filters for EMI reduction in Power Conversion Systems

Guido Ala, Università degli Studi di Palermo, Italy Graziella Giglia, Università degli Studi di Palermo, Italy Antonino Imburgia, Università degli Studi di Palermo, Italy Rosario Miceli, Università degli Studi di Palermo, Italy Giuseppe Rizzo, Università degli Studi di Palermo, Italy Pietro Romano, Università degli Studi di Palermo, Italy Fabio Viola, Università degli Studi di Palermo, Italy Simone Quondam Antonio, Università degli Studi di Perugia, Italy Hari Prasad Rimal, Università degli Studi di Perugia, Italy

400 Modelling, simulation and characterization of Li-Ion battery cell

Vincenzo Castiglia, University of Palermo, Italy Rosario Miceli, University of Palermo, Italy Guido Ala, University of Palermo, Italy Pietro Romano, University of Palermo, Italy Fabio Viola, University of Palermo, Italy Graziella Giglia, University of Palermo, Italy Antonino Imburgia, University of Palermo, Italy Giuseppe Schettino, University of Palermo, Italy

406 Equivalent lumped parameters model for parasitic elements in inductances for power applications Antonino Laudani, University of Roma Tre, Italy

Gabriele Maria Lozito, University of Roma Tre, Italy

411 Characterization of Soft Ferrite Cores in Power Electronic Applications Hari Prasad Rimal, University of Perugia, Italy Simone Quondam Antonio, University of Perugia, Italy Abdelrahman Mohamed Ghanim, University of Perugia, Italy Francesco Cutugno, University of Perugia, Italy

415 **Dynamic Losses Prediction in NOG Electrical Steels for Electrical Machines** *Abdelrahman Mohamed Ghanim, University of Perugia, Italy Hari Prasad Rimal, University of Perugia, Italy Francesco Cutugno, University of Perugia, Italy*

Thursday September 12

Sensors and transducers, integration of sensors, active and passive sensors, sensor modeling and analysis, environmental sensing

Room: 007, Centro Didattico Morgagni Chair: Mirko Marracci, University of Pisa, Italy

421 Smart Sensing in Mobility: a LoRaWAN Architecture for Pervasive Environmental Monitoring

Tommaso Addabbo, University of Siena, Italy Ada Fort, University of Siena, Italy Marco Mugnaini, University of Siena, Italy Lorenzo Parri, University of Siena, Italy Alessandro Pozzebon, University of Siena, Italy Valerio Vignoli, University of Siena, Italy

427 Intelligent Embedded Load Detection at the Edge on Industry 4.0 Powertrains Applications

Simon Akhtari, Lenord, Bauer & Co. Gmbh, Germany Fritz Pickhardt, Lenord, Bauer & Co. Gmbh, Germany Danilo Pau, STMicroelectronics, Italy Alessandra Di Pietro, STMicroelectronics, Italy Giusy Tomarchio, STMicroelectronics, Italy

N/A Identification of tribological regimes trough vibration analysis in an unloaded helical gear pair

Vincenzo Niola, University of Naples Federico II, Italy Giuseppe Quaremba, University of Naples Federico II, Italy Chiara Cosenza, University of Naples Federico II, Italy Leonardo Russo, University of Naples Federico II, Italy Sergio Savino, University of Naples Federico II, Italy

436 AIRBOX: a monitoring system of physiological parameters and mind performance in microclimate-controlled environment

Davide Bertolotti, Politecnico di Milano, Italy Daniele Valentino De Vincenti, Politecnico di Milano, Italy Michele Amedeo Bertoldi, Politecnico di Milano, Italy Luca Cerina, Politecnico di Milano, Italy Marco D. Santambrogio, Politecnico di Milano, Italy

442 A wearable Low-cost Measurement System for Estimation of Human Exposure to Vibrations

Tommaso Addabbo, University of Siena, Italy Ada Fort, University of Siena, Italy Elia Landi, University of Siena, Italy Riccardo Moretti, University of Siena, Italy Marco Mugnaini, University of Siena, Italy Lorenzo Parri, University of Siena, Italy Valerio Vignoli, University of Siena, Italy

Automotive technologies, electric vehicle transportation systems, environmental impact of electric vehicles, autonomous vehicles, road user safety

Room: 013, Centro Didattico Morgagni Chair: Niccolò Baldanzini, University of Florence, Italy

447 A Model-Based Observer for Intelligent Tire Concepts

Luigi Romano, University of Technology Gothenburg, Sweden Salvatore Strano, University of Naples Federico II, Italy Mario Terzo, University of Naples Federico II, Italy

453 Feel-tire Unina: Development and Modeling of a Sensing System for Intelligent Tires Giovanni Breglio, University of Naples Federico II, Italy Andrea Irace, University of Naples Federico II, Italy Vincenzo Romano Marrazzo, University of Naples Federico II, Italy Michele Riccio, University of Naples Federico II, Italy Luigi Romano, University of Naples Federico II, Italy Salvatore Strano, University of Naples Federico II, Italy Mario Terzo, University of Naples Federico II, Italy

459 Smart Mobility: a modern approach to automotive product development for vehicle electrification Paolo Righettini, University of Bergamo, Italy Roberto Strada, University of Bergamo, Italy Alessandro Gosatti, University of Bergamo, Italy Stefano Togni, University of Bergamo, Italy Francesco Camozzi, Brembo S.p.A., Italy Cristiano Fissore, Brembo S.p.A., Italy

465 **Car collision avoidance with velocity obstacle approach** Maicol Laurenza, University of Rome "La Sapienza", Italy Gianluca Pepe, University of Rome "La Sapienza", Italy Dario Antonelli, University of Rome "La Sapienza", Italy Antonio Carcaterra, University of Rome "La Sapienza", Italy

471 **Green Routing Plan for University Shuttle Services Using Mixed Integer Linear Programming** Selin Hulagu, ITS Research Lab, Turkey Gulfem Atasayar, ITS Research Lab, Turkey Hilmi Berk Celikoglu, ITS Research Lab, Turkey

477 Remote controlled braking actuation for motorcycle safety system development

Cosimo Lucci, University of Florence, Italy Lorenzo Berzi, University of Florence, Italy Niccolò Baldanzini, University of Florence, Italy Giovanni Savino, University of Florence, Italy, Monash University Accident Research Centre, Australia

483 Index of Authors