PROF. GIACOMO SCELBA

ACADEMIC DISCIPLINE Area 09 - Industrial and information engineering: ING-IND/32 Power electronic converters, electrical machines and drives

RESEARCH ACTIVITIES

Giacomo Scelba's research activity was initially focused on the study and implementation of various sensorless control strategies for different types of electrical machines and on the implementation of control techniques to optimize energy efficiency in electrical drives, for industrial applications and distributed generation systems. In recent years his research has been also devoted to fault tolerant, single/multi-motor drives, and single-phase three-phase grid synchronization algorithms applied to highly distorted grids, advanced power electronics converters for motor drive applications. His research activities have also been carried out by partnerships with the Standard Drives Development Engineering Group of Rockwell Automation in Mayfield Heights (OH, USA), the Multisegment Industrial Sectors System Lab Group of ST Microelectronics Catania (IT), the R&D center of Quietrevolution Ltd (UK), and the Magneti Marelli (IT). These collaborations have concerned the development of new techniques for sensorless drives in automotive and industrial applications and home appliances; the development of loss-minimization algorithms in electrical drives; the analysis and implementation of MPPT techniques for wind turbines; the development of power generation units from renewable energy sources such as wind, solar and wave energy. In 2014 he was also involved in a research project with the National Institute for Nuclear Physics – Italy (INFN) on the study and design of a Power Conversion System for submarine measurement units. In 2004 he spent a research period at Rockwell Automation, developing a sensorless control strategy based on the injection of additional high frequency signals for three-phase induction machines. In July 2008 he was the recipient of a scholarship for the regional project "Piano ICT per l'Eccellenza del settore Hi-tech nel territorio Catanese (ICT-E1)", regarding the establishment of academic spin-offs in the field of electrical and electronic technologies for energy conversion and industry automation.

PATENTS

Title: sensorless rotor angle detection circuit and method for a permanent magnet synchronous machine. Patent Number: United States Patent Number 9325263 Date: 26 April 2016. Inventors: Dino Costanzo, Giacomo Scelba, Giuseppe Scarcella.

AWARDS AND RECOGNITIONS

2014 First Prize Paper Award Industrial Drives Committee of the IEEE Industry Applications Society with the paper titled: Fault Tolerant Rotor Position and Velocity Estimation Using Binary Hall-Effect Sensors for Low Cost Vector Control Drives, by G. Scelba, G. Scarcella, G. De Donato, F. Giulii Capponi, F. Bonaccorso.

2016 Third Prize Paper Award Industrial Drives Committee of the IEEE Industry Applications Society with the paper titled: Hall-Effect Sensor Fault Detection, Identification, and Compensation in Brushless DC Drives, by G. Scelba, G. De Donato, M. Pulvirenti, F. Giulii Capponi, and G. Scarcella.

2016 Best paper award of the 11th International Conference Elektro 2016 with the paper titled: Hardware in the Loop for Failure Analysis in AC Motor Drives, by G. Scelba, G. Scarcella, M. Cacciato, and G. Aiello.

2018 Best paper award of the 12th International Conference Elektro 2018 with the paper titled: RealTime Emulation of a Three-Phase Vienna Rectifier with Unity Power Factor Operations, by G. Aiello, M. Cacciato, G. Scarcella, G. Scelba, F. Gennaro, N. Aiello.

2018 Third Prize Paper Award from the IES Electrical Machines Technical Committee with the paper presented at IECON 2017, titled: On-Line Stator Winding Resistance and Rotor Permanent Magnet Flux Estimation for Dual-Three Phase PMSM drives, by M. Pulvirenti, G. Scelba, G. Scarcella, M. Cacciato and L.D. Tornello.

EDITORIAL ACTIVITY

Since March 2016 Giacomo Scelba is Associate Editor for the international journal IEEE Transactions on Industry Applications. Moreover, he is a reviewer for the following journals:

- IEEE Transactions on Industry Applications.
- IEEE Transactions on Power Electronics.
- IEEE Transaction on Industrial Electronics.
- IEEE Journal of Emerging and Selected Topics in Power Electronics.
- IEEE Transactions of the Institute of Measurement and Control.
- Taylor & Francis, Electric Power Components and Systems.

He is also a reviewer for numerous conferences: EPE, ISIE, IEMDC, ECCE, ICEM, ELEKTRO, SLED, IECON. He has been Track Chair and Topic Chair for the international conference ECCE in the years 2013-2018.