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The Department of Automatic Control & Systems Engineering
is pleased to announce the following seminar:

Recent Research in Power Electronics, Renewables and Smart Grids

Professor Carlo Cecati

*Department of Electrical and Information Engineering and Economics,
University of L'Aquila*

Wednesday, 12th February 2014 at 13:00

LT01, Sir Frederick Mappin Building

Abstract

In this talk, an overview of our recent research of ICT for Energy Group at DISIM-UAQ, University of L'Aquila, Italy, in power electronics, renewables and smart grids will be presented. Firstly, we will introduce some analytical procedures for Selective Harmonic Elimination (SHE) and Selective Harmonic Mitigation (SHM) that have been developed at DISIM-UAQ to remove a single harmonic (SHE) or a group of harmonics (SHM) of multi-level converters to reduce computational burden so that the SHE/SHM strategy can be implemented in real time. Secondly, we will talk about applying Extended Describing Functions (EDF) to the control of LLC DC/DC resonant converters under wide input voltage and load variations. A nonlinear observer-based controller is proposed to stabilize the output of LLC DC/DC resonant converters effectively. Thirdly, a grid-connected multi-string photovoltaic system with a three-level voltage source converter will be discussed, with a cascaded control structure involving a voltage controller and a current controller. Finally, a Simulink model of silicon carbide devices will be presented to facilitate the accurate simulation of next generation power converters.

Biography

Dr Carlo Cecati is a Full Professor of Converters, Electrical Machines and Drives at University of L'Aquila, Italy. He is a Fellow of IEEE and the Editor-in-Chief of *IEEE Trans. on Industrial Electronics*, after serving as Co-Editor-in-Chief, Associate Editor since 2004. He also served as an Editor of *IEEE/ASME Trans. on Mechatronics* (2006-2008) and a Guest Editor of several special sections of *IEEE Trans. on Industrial Electronics* and *IEEE Trans. on Industrial Informatics*.

His research interests fall into the area of renewable energies and energy saving, in particular, the application of power electronics to renewable energy, distributed generation, smart grids and electrical drives, with emphasis on control, modulation techniques, fault diagnosis, microprocessor applications and industrial networks. In these fields, he published more than 130 papers in the most prestigious international journals and conference proceedings. He was a recipient of the Best Paper Awards of *IEEE Transactions on Industrial Informatics* and *IEEE Industrial Electronics Magazine*.

He has been an Invited Speaker and a Tutorial Speaker at several universities and conferences in USA, Canada, U.K., Korea, Denmark, Qatar, China, Poland, Angola, Italy. He has been an evaluator of research projects for several national and international institutions including the European Community and Qatar National Research Foundation and an evaluator for numerous international universities in promotions to assistant/associate/full professors and in electrical degree course accreditation.

Dr Cecati co-founded DigiPower Ltd in 2007, being C.E.O. until 2012 and now is Principal Scientist and Technical Director.