



ICIT 2021 Special Session Proposal

Electric drives for electrical mobility and green energy

Session Organizers:



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Ignacio González-Prieto was born in Malaga, Spain, in 1987. He received the Industrial Engineer and M.Sc. degrees in Fluid Mechanics from the University of Malaga, Spain, in 2012 and 2013, respectively, and the Ph.D. degree in electronic engineering from the University of Seville, Seville, Spain, in 2016. His research interests include multiphase machines, wind energy systems, and electrical vehicles



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Alejandro G. Yepes (S'10-M'12-SM'19) received the M.Sc. and Ph.D. degrees in electrical engineering from the University of Vigo, Vigo, Spain, in 2009 and 2011, respectively. Since 2008, he has been working with the Applied Power Electronics Technology Research Group, University of Vigo. From August 2016 to June 2018, he stayed with the Department of Electrical and Computer Engineering, Texas A&M University, College Station, TX, USA, after which he returned to the University of Vigo. His research interests are in the areas of ac power conversion, with special focus, currently, on multiphase drives. He is a member of the IEEE-IES Technical Committee on Power Electronics.



Prof. Dr.-Ing. habil. Christoph M. Hackl

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Christoph M. Hackl (M'12-SM'16) was born in 1977 in Mannheim, Germany. He received the B.Sc., Dipl.-Ing., and Dr.-Ing. (Ph.D.) degrees in Electrical Engineering from Technical University of Munich (TUM), in 2003, 2004, and 2012, respectively. After studying Electrical Engineering (with focus on controls and mechatronics) at Technical University of Munich (TUM), Germany and University of Wisconsin-Madison, USA. In 2018, he became a Professor for Electrical Machines and Drives, and the Head of the “Laboratory for Mechatronic and Renewable Energy Systems (LMRES)” and, in 2019, the Co-Head of the newly founded “Research Institute for Sustainable Energy Systems (ISES)” at the Munich University of Applied Sciences (MUAS), Germany. His research interests include nonlinear, adaptive and optimal control of electrical, mechatronic, and renewable energy systems.



-Technical Outline of the Session and Topics:

Emerging applications in the field of electric mobility and green energy (such as wind and tidal energy) have opened new opportunities for electric drives. These applications imply special requirements in terms of flexibility, reliability and efficiency. In particular, multiphase machines are especially suitable in this context, since they are advantageous in terms of flexibility and reliability. Concerning flexibility, the higher degrees of freedom offered by multiphase machines allow additional functionalities, such as integrated on-board chargers, hybrid AC/DC generation, or enhancing motor braking capability. Regarding reliability, various studies on fault detection, converter reconfiguration and fault tolerant control of electric machines have been conducted in the past decades. In electric vehicles, it is also crucial to improve the overall efficiency by proper modelling and minimization of the drive losses, so that the energy provided by the batteries is exploited to a greater extent and hence the operation range of the vehicle is prolonged. This special session calls for papers that explore new design, analysis or control techniques for three-phase and multiphase drives, as well as new converter topologies, suitable for electric drive applications in electric mobility and green energy.

Topics of the Session

- *Design of three-phase and multiphase drives for electric vehicles and generators for green energy*
- *Modeling and analysis of three-phase and multiphase drives*
- *Modeling and minimization of losses in three-phase and multiphase drives*
- *Analysis and improvement of efficiency for three-phase and multiphase drives*
- *Control methods for three-phase and multiphase drives*
- *Fault detection and fault tolerant control for three-phase and multiphase drives*
- *New converter topologies for three-phase and multiphase drives*
- *Integrated on-board chargers utilizing three-phase and multiphase drives*

-IEEE IES Technical Committee Sponsoring the Special Session (if any):

IES Technical Committee on Power Electronics