24th International Conference on Electrical Machines (ICEM'2020)
Gothenburg, Sweden, August 23rd-26th, 2020

Tutorial-8: Sunday, 23rd August 2020, 15:00-17:30 CET.

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Advanced Linear Induction Machines and Drive Systems for Industrial Applications

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Tutorial Abstract:
Rotating machines (RMs) have been existing for almost 200 years (since 1820s). Their linear counterpart, called linear machines (LMs), have been introduced at the turn of 20th century, which can realize the conversion of electrical energy to linear motion mechanical energy (or vice versa) directly through electromagnetic forces. Due to the need of power electronics for motion control (in absence of a mechanical transmission), LMs have been paid wide industrial attention only after 1960s. The tutorial aims to share the advancements in the linear machine topologies, integrated modelling, high-performance control strategies and its emerging applications in transportation, energy conversion systems, and so on. Researchers and engineers from electrical, mechanical and information fields may find it useful when dealing with transportation motor and drive related design, optimization and control development, mechanical design and analysis, etc. The main subject of the tutorial will mostly focus on design and control for the linear induction machines (LIMs).

Biographies:

Prof. Wei Xu (M'09-SM'13) received the double B.E. and M.E. degrees from Tianjin University, Tianjin, China, in 2002 and 2005, and the Ph.D. from the Institute of Electrical Engineering, Chinese Academy of Sciences, in 2008, respectively, all in electrical engineering. From 2008 to 2012, he held several academic positions in Australia and Japan. Since 2013, he has been full professor with School of Electrical and Electronic Engineering, Huazhong University of Science and Technology (HUST), China. His research topics focus on linear machines and drives (http://machinececs.seee.hust.edu.cn/). He has 100+ IEEE Transactions papers, three books, and 120+ Invention Patents. He is Fellow of the Institute of Engineering and Technology (IET). He will serve as the General Chair for 2021 International Symposium on Linear Drives for Industry Applications (LDIA 2021) and 2023 IEEE International Conference on Predictive Control of Electrical Drives and Power Electronics (PRECEDE 2023), in Wuhan, China, respectively. He has served as Associate Editor for several IEEE Transactions Journals, such as IEEE Transactions on Industrial Electronics, IEEE Transactions on Vehicular Technology, IEEE Transactions on Energy Conversion, and so on.

Dr. Marcello Pucci (M'03-SM'11) received the Laurea and Ph.D. degrees in Electrical Engineering from the University of Palermo, Italy, in 1997 and 2002, respectively. In 2000 he has been a host student at the Institute of Automatic Control, Technical University of Braunschweig, Germany. Since 2001, he has been a researcher at the Institute of Intelligent Systems for Automation, Section of Palermo, Italy, where he is currently a Senior Research Scientist. Dr. Pucci's research interests mainly include advanced control for AC machines, particularly the linear machines and drives. He is an associate editor of the IEEE Transactions on Industrial Electronics and IEEE Transactions on Industry Applications. He is a member of the Editorial Board of the "Journal of Electrical Systems".