

Lectures on Power Electronics and Mechatronics

Date January 27, 2020
Location ETZ E8 / ETH Zurich, Gloriastrasse 35, 8092 Zurich
Time 11.00h– 12.00h



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Minimization Technologies for Passive Components based on Circuit Topology and Its Control

The requirement of the high power density for power converters becomes stronger and stronger. Nowadays, the volume of the cooling system is smaller and smaller due to appearing wide band gap, i.e. SiC and GaN power semiconductor devices. In contrast, passive components such as inductors and capacitors dominate the volume of the power converters. In this presentation, the minimization technologies for passive components are introduced with different kinds of circuit topology and control. The ac-to-ac direct power converters not requiring a smoothing DC capacitor, the active power decoupling circuit reducing the smoothing DC capacitor in the single-phase ac converters, the current discontinuous mode control reducing interconnection inductors and FRT control for minimizing the inductor size will be presented.

Biography

Jun-ichi Itoh was born in Tokyo, Japan, in 1972. He received his M.S. and Ph.D. degree in electrical and electronic systems engineering from Nagaoka University of Technology, Niigata, Japan in 1996, 2000, respectively. From 1996 to 2004, he was with Fuji Electric Corporate Research and Development Ltd., Tokyo, Japan and he was with Nagaoka University of Technology, Niigata, Japan as an associate professor. Since 2017, he has been a professor. His research interests are matrix converters, dc/dc converters, power factor correction techniques, energy storage system and adjustable speed drive systems.

He received the IEEJ Academic Promotion Award (IEEJ Technical Development Award) in 2007. In addition, he also received the Isao Takahashi Power Electronics Award in IPEC-Sapporo 2010 from IEEJ, Prizes for Science and Technology (Development Category) from the Commendation for Science and Technology by the Minister of Education, Culture, Sports, Science and Technology, April 2017, 4th Nagamori Awards, 2018 and so on. Dr. Itoh is a senior member of the Institute of Electrical Engineers of Japan, the Society of Automotive Engineers of Japan and the IEEE.

The lecture is open to the public. The event takes place within the scope of the Swiss Chapter of IEEE Power Electronics Society, <https://www.ieee.ch/chapters/pels/>