

P4C: Power networks for communications engineers

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Tutorial

[2011 IEEE International Conference on Smart Grid Communications](#)

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The goal of the P4C tutorial is to explain how the power network works, and especially highlight the smart grid challenges which are faced today.

Background and content

Environmental concerns and various benefits of small on site generation have resulted in significant penetration of dispersed generation in many distribution systems. Such a system demands for a much more intelligent grid structure (Smart-grid) and results in various operational problems like balancing, stability and reliability problems in the network together with power quality. In addition, various aspects of islanded operation of distribution systems with dispersed generation are also issues to consider.

Following topics are covered in the tutorial:

- The energy demand and supply of power
- The nature of the dispersed generation (Wind, Photovoltaic, others)
- Basic operation and protection of the grid (classical, dispersed)
- Power quality issues
- Grid reconnection requirements

- Synchronization and island detection
- Control and operation of dispersed generation grid connected and islanded scenario
- Communication demands now and in the future
- Future trends, micro-grid & smart grid

Biography :

Frede Blaabjerg, Aalborg University, Denmark

Frede Blaabjerg was employed at ABB-Scandia, Randers, from 1987-1988. During 1988-1992 he was a PhD. student at Aalborg University. He became an Assistant Professor in 1992 at Aalborg University, in 1996 Associate Professor and in 1998 full professor in power electronics and drives the same place. In 2000 he was visiting professor in University of Padova, Italy as well as he became part-time programme research leader at Research Center Risoe in wind turbines. In the period of 2006-2010 he was the dean of the faculty of Engineering, Science and Medicine at Aalborg University, Denmark. In 2002 he was visiting professor at Curtin University of Technology, Perth, Australia as well as he became visiting professor for Zhejiang University, China.

His research areas are in power electronics, static power converters, ac drives, switched reluctance drives, modelling, characterization of power semiconductor devices and simulation, power quality, wind turbines, custom power systems and green power inverter. He has been involved many research projects with the industry. Among them has been the Danfoss Professor Programme in Power Electronics and Drives. He is the author or co-author of more than 600 publications in his research fields including the book "Control in Power Electronics" (Eds. M.P. Kazmierkowski, R. Krishnan, F. Blaabjerg) 2002, Academic Press. Out of those +400 papers are registered in IEEExplore with more than 150 ISI-registered journal papers. He is IEEE Fellow since 2003.

Dr. Blaabjerg is a member of the European Power Electronics and Drives Association and the IEEE Industry Applications Society Industrial Drives Committee. He is also a member of the Industry Power Converter Committee and the Power Electronics Devices and Components Committee in the IEEE Industry Application Society. He is associated editor of the IEEE Transactions on Industry Applications, IEEE Transactions on Power Electronics, Journal of Power Electronics and of the Danish journal Elteknik. From 2006 he has been Editor in Chief of the IEEE Transactions on Power Electronics as well as Distinguished lecturer for the IEEE Power Electronics Society from 2005 to 2007. It is followed up as Distinguished lecturer for the IEEE Industry Applications Society from 2010 to 2012.

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