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ISIE 2010 Bari IEEE International Symposium on Industrial Electronics ITALY 4-7 July 2010

TUTORIAL

Advanced Computational Methods for Identification, Control and Optimization in Smart Grids

Presented by

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Synopsis

The smart electric power grid will be a complex adaptive system under semi-autonomous distributed control. It will be spatially and temporally complex, non-convex, nonlinear and non-stationary with a lot of uncertainties. The integration of renewable energy such as wind farms, and plug-in hybrid and electric vehicles further adds complexity and challenges to the various controllers at all levels of the smart grid. Advanced computational methods are required for planning and optimization, fast control of smart grid elements, processing of field data and coordination across the grid. Distributed and coordinated intelligence at all levels and across levels of the smart grid – generation, transmission and distribution is inevitable if a true smart grid is to be reality. Computational intelligence (CI) is the study of adaptive mechanisms to enable or facilitate intelligent behavior in complex, uncertain and changing environments. This tutorial will provide an introduction to CI and how CI techniques can be applied for modeling, control and optimization of smart grids.

About the Speaker

Venayagamoorthy received his Ph.D. degree in electrical engineering from the University of KwaZulu Natal, Durban, South Africa, in Feb. 2002. Currently, he is an Associate Professor of Electrical & Computer Eng., and the founder and Director of the Real-Time Power & Intelligent Systems (RTPIS) Laboratory at Missouri University of Science & Tech., USA. His research interests are in the development of advanced computational algorithms for smart grid applications. He has published 2 edited books, 5 book chapters, and over 80 refereed journals papers and 270 refereed conference proceeding papers. He is currently an Associate Editor of the IEEE Transactions of Evolutionary Computation and an Editor of the IEEE Transactions on Smart Grid. Visit <http://mst.edu/~ganeshv> for more information.