

PLENARY SESSION

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IEEE Distinguished Lecturer: Anuradha Annaswamy

Talk Title: A Dynamic Framework for Integration of Renewables in Smart Grids

Date: 22-25 March 2018

Venue: Vincci Hotel, Hammamet-Tunisia



BIOGRAPHY

Dr. Anuradha Annaswamy received her Ph.D. in Electrical Engineering from Yale University in 1985. She has been a member of the faculty at Yale, Boston University, and MIT where currently she is the director of the Active-Adaptive Control Laboratory and a Senior Research Scientist in the Department of Mechanical Engineering. Her research interests pertain to adaptive control theory and applications to aerospace, automotive, and propulsion systems, cyber physical systems science, and CPS applications to Smart Grids, Smart Cities, and Smart Infrastructures. She is the author of a hundred journal publications and numerous conference publications, co-author of a graduate textbook on adaptive control (2004), co-editor of several reports including “Systems & Control for the future of humanity, research agenda: Current and future roles, impact and grand challenges,” (Elsevier) “IEEE Vision for Smart Grid Control: 2030 and Beyond,” (IEEE Xplore) and *Impact of Control Technology*, (ieeecss.org/main/loCT-report, ieeecss.org/general/loCT2-report).

Dr. Annaswamy has received several awards including the George Axelby and Control Systems Magazine best paper awards from the IEEE Control Systems Society (CSS), the Presidential Young Investigator award from NSF, the Hans Fisher Senior Fellowship from the Institute for Advanced Study at the Technische Universität München, the Donald Groen Julius Prize from the Institute of Mechanical Engineers, a Distinguished Member Award, and a Distinguished Lecturer Award from IEEE CSS. Dr. Annaswamy is a Fellow of the IEEE and IFAC. She has served as the Vice President for Conference Activities (2014-15), and is currently serving as the VP for Technical Activities (2017-18) in the Executive Committee of the IEEE CSS. She is the Deputy Editor of the Elsevier publication Annual Reviews in Control (2016-present).

ABSTRACT

Two major players in a smart grid are renewables and flexible consumption. The former is necessitated by global concerns of sustainability and greenhouse gas emissions, and dwindling resources of fossil fuels. The latter is enabled through the feasibility of fast and large-scale communication and the growing acceptance and economic potential of flexible consumption. Introduction of these two players brings with it a host of challenges, many of which stem from the introduction of complex and uncertain dynamics at various time-scales. In order to assess the impact of these dynamics, and realize the desired goals of a smart grid, of delivering affordable and reliable power to all end-users, an end-to-end framework that is dynamic, and allows the deployment of various analysis and synthesis tools of stability, estimation, optimization, and control is needed. This framework should not only encompass the physically relevant, and traditional timescales of frequency and voltage control, but economically relevant market-based decisions for planning and economic dispatch. More importantly, this framework should address the interactions between the former active-control components that manipulate physical variables and the latter transactive-control components that manipulate economic variables. In this talk, recent results developed in the AAC laboratory at MIT related to the development of such a dynamic framework will be presented.

Welcome!