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THE CHINESE UNIVERSITY OF HONG KONG
Department of Information Engineering and
Department of Mechanical and Automation Engineering

Jointly Presented Seminar

Mean Field Game Theory and the Decentralized Control of Wireless Networks

by
Professor Peter E. Caines
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Date : 15 Jan., 2015 (Thur.)
Time : 4:30 – 5:30pm
Venue : Room 121, Ho Sin Hang Engineering Building
The Chinese University of Hong Kong

Abstract

Mean Field Game (MFG) theory gives tractable strategies for the decentralized control of large scale systems wherein each agent's control feedback depends only upon on its state and the precomputable state distribution of the generic agent, i.e. the system's mean field. The heart of this approach is the solution of the system's Hamilton-Jacobi-Bellman and Fokker-Planck-Kolmogorov equations linked by the system's mean field. This talk will present decentralized MFG control strategies yielding Nash Equilibria for Code Division Multiple Access (CDMA) networks where the performance function of each agent is a combination of its Quality of Service (QoS) and its transmitted power. Computational examples of decentralized MFG cellular network control strategies will be presented for downlink and uplink scenarios and it will be shown that, surprisingly, for sufficiently large populations MFG control performance approximates that of globally optimal centralized control.

Work with Mohamad Aziz.

Biography

Professor Peter Caines received a BA in mathematics from Oxford University and then a PhD in systems and control theory in 1970 from Imperial College, University of London. In 1980 he joined McGill University where he is James McGill Professor and Macdonald Chair in the Department of Electrical and Computer Engineering. He is a Life Fellow of the IEEE, Fellow of SIAM and IMA and is a Fellow of the Royal Society of Canada. In 2009 he received the IEEE Control Systems Society Bode Lecture Prize and in 2012 a Queen Elizabeth II Diamond Jubilee Medal. He is the author of Linear Stochastic Systems, John Wiley, 1988.

**** ALL ARE WELCOME ****

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