# Power Control in Wireless Multi-carrier Communication Systems

Professor HUANG Jianwei

Dept. of Information Engineering, The Chinese University of Hong Kong

## Abstract

Multi-carrier communication techniques have been successfully implemented in various wireless networks, and have become the core for 4G mobile communication systems. For example, Orthogonal Frequency-Division Multiplexing (OFDM) has been used in standards such as Wireless LAN (802.11 a/g), WiMAX (802.16), Digital audio/video broadcasting (DAB/DVB) and Ultra Wideband (UWB). The major benefits of using multi-carrier techniques include high spectrum efficiency and resistance against multi-path interferences.

In this talk, we consider the power control problem in wireless multi-carrier communication systems. We solve the problem using an Asynchronous Distributed Pricing (ADP) algorithm, which has a nice interpretation of distributed Pigovian taxation. We show the optimality and convergence of the ADP algorithm using supermodular game theory, which is a game with various nice features and wide applications in engineering and economics.

## Biography of Speaker

Professor Huang Jianwei is an Assistant Professor in the Department of Information Engineering at the Chinese University of Hong Kong. He received the M.S. and Ph.D. degrees in Electrical and Computer Engineering from Northwestern University (Evanston, IL, USA) in 2003 and 2005, respectively. From 2005 to 2007, He worked as a Postdoctoral Research Associate in the Department of Electrical Engineering at Princeton University (Princeton, NJ, USA). In 2004 and 2005, he worked in the Mathematics of Communication Networks Group at Motorola (Arlington Heights, IL, USA) both as a full time summer intern and a part time researcher. In 1999, he worked as a summer intern in the Department of Change Management at GKN Westland Aerospace (Cowes, Isle of Wight, UK). His main research interests lie in the area of modeling and performance analysis of communication networks, with specific areas including cognitive radio networks, wideband OFDM and CDMA systems, wireless medium access control, multimedia communications, network economics, and applications of optimization theory and game theory.

Professor Huang is an Associate Editor of *(Elsevier) Journal of Computer & Electrical Engineering*, the Lead Guest Editor of the *IEEE Journal of Selected Areas in Communications* special issue on "Game Theory in Communication Systems", the Lead Guest Editor of *Journal of Advances in Multimedia* special issue on "Collaboration and Optimization in Multimedia Communications", and a Guest Editor of *Journal of Advances in Multimedia* special issue on "Cross-layer Optimized Wireless Multimedia Communications".

He will be the Technical Program Committee Co-Chair of the International Conference on Game Theory for Networks (GameNets'09), and is a TPC member for many conferences such as IEEE INFOCOM, GlobeCom, WCNC, ICCCN, CCNC, and CrownCom. Professor Huang is the recipient of a 2001 Walter P. Murphy Fellowship at Northwestern University and a 1999 Chinese National Excellent Student Award.