Liang Dong

Biography: Liang Dong is an associate professor of electrical and computer engineering at Baylor University, Texas, USA. Liang Dong received the B.S. degree in applied physics with minor in computer engineering from Shanghai Jiao Tong University, China, in 1996, and the M.S. and Ph.D. degrees in electrical and computer engineering from The University of Texas at Austin in 1998 and 2002, respectively. From 2002 to 2004, he was a Research Associate with the Department of Electrical Engineering, University of Notre Dame. From 2004 to 2011, he was an Assistant Professor then promoted to a tenured Associate Professor of the Department of Electrical and Computer Engineering at Western Michigan University. In the summer of 2015, he was a visiting researcher at the Department of Electrical Engineering, Stanford University. He joined the faculty of Baylor University in August 2011 as an Associate Professor of Electrical and Computer Engineering. Liang Dong is a senior member of the Institute of Electrical and Electronics Engineers (IEEE). His research interests include green communications, digital signal processing, cyber-physical system and security, social Internet of Things, and e-health applications.

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Abstract: Spectral efficiency and energy efficiency are important design criteria for green communications systems and networks. In this paper, spectral efficiency and energy efficiency are addressed for wireless transmission over frequency-orthogonal channels. The maximum sum rate is used in measuring spectraland energy-efficiency. Towards achieving the maximum efficiency, two separated optimization problems are formulated. With a fixed transmit power allocation, the optimal bandwidth assignment is given in closed form. Then, a procedure is provided to determine the total bandwidth for maximum spectral efficiency. With a fixed bandwidth assignment, the optimal transmit power allocation is given in closed form. Then, a procedure is provided to determine the total transmit power for maximum energy efficiency. Practical data traffic is discussed that affects the maximum efficiency result. Simulation results validate the transmission approaches over frequency-orthogonal channels that achieve the best spectral efficiency and energy efficiency, respectively.