数学与系统科学研究院

计算数学所学术报告

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报告题目：

Multicell Coordinated Beamforming with Rate Outage Constraint

邀请人： 刘亚锋 博士

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报告地点： 科技综合楼三层

311 报告厅

Abstract:

The beamforming design for weighted sum rate maximization in a multiple-input single-output (MISO) interference channel (IFC) with only channel distribution information (CDI) available at the transmitters has drawn extensive attention recently. In this talk, we present some new results on the *transmit beamforming design* under individual transmit power constraints and rate outage constraints. We first analyze the complexity status of this beamforming design problem, and show that this problem is NP-hard in general. Therefore, we are interested in developing efficient and effective approximation algorithms for handling this beamforming design problem. First of all, a recently proposed *successive convex approximation* (SCA) algorithm to search for a stationary solution in polynomial time is introduced. In spite of good performance of the SCA algorithm, it is computationally too expensive to handle the problem instances with a large number of transmitters and receivers. By a judicious problem reformulation, we further propose a Gauss-Seidel type algorithm, called *distributed block successive upper bound minimization* (DBSUM) algorithm, and a Jacobi-type algorithm, called *distributed weighted minimum mean-square error* (DWMMSE) algorithm, for the outage-constrained beamforming design problem. These two algorithms are also shown to converge to the stationary points (solutions); moreover, simulation results demonstrate that both algorithms significantly outperform the SCA algorithm in performance and computational efficiency.

Chong-Yung Chi (祁忠勇) received the Ph.D. degree in Electrical Engineering from the University of Southern California, Los Angeles, California, in 1983. From 1983 to 1988, he was with the Jet Propulsion Laboratory, Pasadena, California. He has been a Professor with the Department of Electrical Engineering since 1989 and the Institute of Communications Engineering (ICE) since 1999 (also the Chairman of ICE during 2002-2005), National Tsing Hua University, Hsinchu, Taiwan. He has published more than 200 technical papers, including more than 75 journal papers (mostly in IEEE Trans. Signal Processing with total citations more than 900 times by Science Citation Index (SCI) and 1800 times by Google-Scholar), 4 book chapters and more than 130 peer-reviewed conference papers, as well as a graduate-level textbook, *Blind Equalization and System Identification*, Springer-Verlag, 2006. His current research interests include signal processing for wireless communications, convex analysis and optimization for blind source separation, biomedical and hyperspectral image analysis.

Dr. Chi is a senior member of IEEE. He has been a Technical Program Committee member for many IEEE sponsored and co-sponsored workshops, symposiums and conferences on signal processing and wireless communications, including *Co-organizer* and *General Co-chairman* of 2001 IEEE Workshop on Signal Processing Advances in Wireless Communications (SPAWC), and *Co-Chair* of Signal Processing for Communications (SPC) Symposium, ChinaCOM 2008 & *Lead Co-Chair* of SPC Symposium, ChinaCOM 2009. He was an Associate Editor (AE) of IEEE Trans. Signal Processing (5/2001~4/2006), IEEE Trans. Circuits and Systems II (1/2006-12/2007), IEEE Trans. Circuits and Systems I (1/2008-12/2009), AE of IEEE Signal Processing Letters (6/2006~5/2010), and a member of Editorial Board of Signal Processing (6/2005~5/2008), and an editor (7/2003~12/2005) as well as a Guest Editor (2006) of EURASIP Journal on Applied Signal Processing. He was a member of *Signal Processing Theory and Methods Technical Committee (SPTM-TC)* (2005-2010), IEEE Signal Processing Society. Currently, he is a member of *Signal Processing for Communications and Networking Technical Committee (SPCOM-TC)* and a member of *Sensor Array and Multichannel Technical Committee (SAM-TC)*, IEEE Signal Processing Society, and an AE of IEEE Trans. Signal Processing.

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