Monotonic optimization for communication and networking systems

Speaker: Dr. Angela Yingjun Zhang
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Abstract:

The global data traffic has reached 885 petabytes per month in 2012, which is more than ten times the global Internet traffic in the entire year of 2000. The rapid demand growth drives the research community to develop evolutionary and revolutionary approaches that push the communication and networking system performance towards new limits. To this end, optimization techniques have been proved extremely useful in approaching the utmost capacity of the limited available radio resources. Most recent advances of optimization techniques rely crucially on the convexity of the problem formulation. Nonetheless, many problems encountered in practical engineering systems are non-convex by their very nature.

An encouraging observation, however, is that a majority of non-convex problems encountered in communication and networking systems exhibit monotonicity or hidden monotonicity structures. A systematic use of monotonicity properties may substantially alleviate the difficulty in obtaining the global optimal solution(s) of the problems, and this is indeed the key idea behind the Monotonic Optimization theory.

In this talk, I will introduce the theory and algorithm of Monotonic Optimization. Together with examples of practical applications, I will illustrate the formulation skills of Monotonic Optimization. This talk aims to spur new research activities in substantially broadening the scope of application of this promising technique in communication and networking systems.

Speaker’s Biography:

Angela Yingjun Zhang received her PhD degree in Electrical and Electronic Engineering from the Hong Kong University of Science and Technology, Hong Kong in 2004. She received a B.Eng in Electronic Engineering from Fudan University, Shanghai, China in 2000.

Since 2005, she has been with Department of Information Engineering, The Chinese University of Hong Kong, where she is currently an Associate Professor. She was with Wireless Communications and Network Science Laboratory at Massachusetts Institute of Technology (MIT) during the summers of 2007 and 2009. Her current research topics include resource allocation, convex and non-convex optimization for wireless systems, stochastic optimization, cognitive networks, MIMO systems, etc.

Dr. Zhang is on the Editorial Boards of IEEE Transactions on Communications, and Wiley Security and Communications Networks Journal. She was an Editor of IEEE Transactions on Wireless Communications, a Guest Editor of IEEE Communications Magazine, Featured Topic on New R&D Tools for Communications Research. She has served as a Workshop Chair of IEEE ICCC 2013, TPC Vice-Chair of Wireless Communications Track of IEEE CCNC 2013, TPC Co-Chair of Wireless Communications Symposium of IEEE GLOBECOM 2012, Publication Chair of IEEE TTM 2011, TPC Co-Chair of Communication Theory Symposium of IEEE ICC 2009, Track Chair of ICCCN 2007, and Publicity Chair of IEEE MASS 2007. She was a Co-Chair of IEEE ComSoc Multimedia Communications Technical Committee, an IEEE Technical Activity Board GOLD Representative, 2008 IEEE GOLD Technical Conference Program Leader, IEEE Communication Society GOLD Coordinator, and a Member of IEEE Communication Society Member Relations Council (MRC). She is a co-recipient of 2011 IEEE Marconi Prize Paper Award on Wireless Communications, the Annual Best Paper Award of IEEE Transactions on
Wireless Communications. She received the Young Researcher Award of CUHK in 2011. As the only winner from Engineering Science, she has won the Hong Kong Young Scientist Award 2006, conferred by the Hong Kong Institution of Science.