



THE CHINESE UNIVERSITY OF HONG KONG
Institute of Network Coding
and
Department of Information Engineering
Seminar



Turbo Compressed Sensing with Partial DFT Sensing Matrix

by

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The Chinese University of Hong Kong

Abstract

Partial discrete Fourier transform (DFT) sensing matrices have found many applications and an efficient signal recovery algorithm is highly desirable for related compressed-sensing problems. Approximate message passing (AMP) is a low-complexity compressed-sensing algorithm developed for this purpose. Analysis indicates that AMP works well when sensing matrices are independent and identically drawn, but it doesn't when partial DFT sensing matrices are involved. In this talk, we introduce a novel compressed sensing algorithm, termed turbo compressed sensing, involving partial DFT sensing matrices. We show that the proposed algorithm significantly outperforms the AMP algorithm when partial DFT sensing matrices are employed. Further, we establish the state evolution of the proposed algorithm, and interestingly show that this state evolution is consistent with the prediction by the replica method.

Biography

Xiaojun Yuan received the Ph.D. degree in Electrical Engineering from the City University of Hong Kong in 2008. From 2009 to 2011, he was a research fellow at the Department of Electronic Engineering, the City University of Hong Kong. He was also a visiting scholar at the Department of Electrical Engineering, the University of Hawaii at Manoa in spring and summer 2009, as well as in the same period of 2010. From 2011 to 2014, he was a research assistant professor with the Institute of Network Coding, The Chinese University of Hong Kong. He is now an assistant professor with the School of Information Science and Technology, ShanghaiTech University, supported by the Thousand Youth Talents Plan in China. His research interests cover a broad range of statistical signal processing and information theory including wireless communications, network information theory, compressed sensing, etc. He has published over 80 peer-reviewed research papers in the leading international journals and conferences, and has served on a number of technical programs for international conferences. He is an editor of the IEEE Transactions on Communications. He was a co-recipient of the Best Paper Award of IEEE ICC 2014.

**** ALL ARE WELCOME ****

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