



THE CHINESE UNIVERSITY OF HONG KONG

Jointly presented seminar by
The Department of Information Engineering and
The Institute of Network Coding

Analysis of message-passing iterative algorithms via zeta functions

by
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Date : 13 May, 2014 (Tue.)
Time : 11:00am – 12:00noon
Venue : Room 833 Ho Sin Hang Engineering Building
The Chinese University of Hong Kong

Abstract

Graphical models and message-passing iterative algorithms have been very popular in the last fifteen years in the area of coded data transmission and beyond because of their low implementation complexity and their outstanding performance. Implicitly, these message-passing iterative algorithms are (approximately) solving certain optimization problems in an efficient way.

Zeta functions have been used to derive a variety of analysis results for graphical models during the last decade. Some recent advances allow us to connect these disparate results and to provide a more unified framework of this approach to the analysis of graphical models. In particular, these advances allow us to connect computation tree pseudo-codewords and graph-cover pseudo-codewords, two central objects in the performance analysis of message-passing iterative decoders of finite-length low-density parity-check codes.

At the end of the talk, we also comment on a tight connection between some of the analyzed code-based graphical models and some graphical models that are used for community detection in networks.

(Based on joint work with Henry D. Pfister, Texas A&M University.)

(The talk is planned to be accessible to an audience with a general background in data communications and/or graphical models.)

Biography

Pascal O. Vontobel received the Diploma degree in electrical engineering in 1997, the Post-Diploma degree in information techniques in 2002, and the Ph.D. degree in electrical engineering in 2003, all from ETH Zurich, Switzerland.

From 1997 to 2002 he was a research and teaching assistant at the Signal and Information Processing Laboratory at ETH Zurich. After being a postdoctoral research associate at the University of Illinois at Urbana-Champaign, at the University of Wisconsin-Madison (visiting assistant professor), and at the Massachusetts Institute of Technology, he was a research scientist with the Information Theory Research Group at Hewlett-Packard Laboratories in Palo Alto, CA, USA, from 2006 to 2013. Currently, he is a visiting scholar at Stanford University. His research interests lie in information theory, communications, and signal processing.

Dr. Vontobel has been an Associate Editor for the IEEE Transactions on Information Theory (2009-2012) and is currently an Associate Editor for the IEEE Transactions on Communications. Currently, he is also a Distinguished Lecturer and a Member of the Awards Committee of the IEEE Information Theory Society. He has been on the technical program committees of several international conferences and has co-organized several topical workshops, most recently a workshop at Princeton University on "Counting, Inference, and Optimization on Graphs." Moreover, he has been three times a plenary speaker at international information and coding theory conferences and has been awarded the ETH medal for his Ph.D. dissertation.

**** ALL ARE WELCOME ****