T2. Network Processing with Bayesian Graphical Models

Abstract:

Bayesian graphical models, such as factor graphs, are gaining increasing importance in the systematic development of algorithms in communication receivers and communication networks. Recent developments have revealed ties between graphical models, statistical physics, variational methods, and convex optimization. Most of these developments originate from the machine learning and statistics communities, and there is an urgent need for communications researchers to become aware of these developments and apply state-of-the-art inference methods to important problems in our own field. This tutorial strives to address this need. It provides an overview of the theory behind graphical models and explores deeper connections between different algorithms. The theory will first be applied to a centralized problem (data detection in a wireless receiver), and a then to a number of distributed problems (tracking, network synchronization, beamforming).

Speaker's Biography:

Henk Wymeersch, Department of Signals and Systems at Chalmers University of Technology, Sweden

Henk Wymeersch is Associate Professor with the Department of Signals and Systems at Chalmers University of Technology, Sweden. Prior to joining Chalmers, during 2006-2009 he was a Postdoctoral Associate with the Laboratory for Information and Decision Systems (LIDS) at the Massachusetts Institute of Technology (MIT). Henk Wymeersch obtained the Ph.D. degree in Electrical Engineering/applied sciences in 2005 from Ghent University, Belgium. He is a member of the IEEE, Associate Editor for IEEE Communication Letters and author of the book Iterative Receiver Design (Cambridge University Press, 2007). His current research interests include algorithm design for wireless transmission, statistical inference, and distributed processing. His accolades include several best paper awards, the Alcatel-Bell Scientific Award, and a 2011 IEEE ComSoc Young Researcher Award (runner-up).