

Computer Science Seminar

Multi-user information theory and an example: the two-way relay channel

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Abstract: One of information theory's main contributions has been the notion of the capacity of a channel – the fundamental limit of how much one can reliably transmit over a (noisy) channel. One of information theory's biggest challenges has been to extend our understanding of the capacity of a channel to obtain the capacity of a network; this remains an open problem. In this talk we first provide a general introduction to multi-user channel capacity before focussing on a simple but insightful network which illustrates some of the key aspects present in multi-user wireless network: the two-way relay channel. This channel consists of two nodes which wish to exchange messages with the help of a relay; we outline recent results which illustrate coding techniques which exploit the two-way and broadcast nature of the data, including lattice, superposition, binning, and block Markov encoding, with sequential, list and joint decoding.

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