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Chapter 1

An Information Theoretic View of Distributed Antenna Processing in Cellular Systems

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This chapter presents a survey of information theoretic results available on DAS in cellular systems. The treatment focuses on the derivation of the sum-rate of different inter-cell and intra-cell communications strategies for both uplink and downlink. A simple symmetric family of cellular models in which the inter-cell interferences are emerging from a the adjacent cells only is considered. Although hardly realistic, this family of models accounts for essential parameters of cellular systems such as inter-cell interference and fading. Whenever computation of the sum-rate is intractable or yields little insight into the problem, asymptotic performance criteria (e.g. extreme-SNR parameters) are evaluated. Emphasis is placed on the assessment of benefits of cooperation among APs (i.e. joint detection/precoding).