

Elektrotechnik-Elektronik-Informationstechnik

EEI KOLLOQUIUM

Modeling and Analysis of Next-Generation Cellular Networks

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Diskussionsleitung: Prof. Dr.-Ing. R. Müller

Cellular networks are becoming increasingly irregular and heterogeneous, and advanced communication and interference mitigation techniques make the notion of a conventional cell obsolete, where there exists a hard association of a user to a single base station. In view of these developments, new modeling and analysis techniques are needed that permit general statements on the network performance and provide answers to fundamental questions on how to engineer future cellular systems. Stochastic geometry provides both the models and the mathematical tools for their analysis, often resulting in closed-form expressions for the distribution of fundamental quantities such as the signal-to-interference ratios (SIRs) and coverage probabilities. Starting from a basic Poisson model, we will present different refinements of models for heterogeneous cellular systems, and we will derive the SIR distribution and analyze different forms of base station cooperation. It turns out that the mean interference-to-signal ratio plays a crucial role in determining the SIRs for different architectures and transmission schemes.