



Detection and Estimation of Wireless Propagation Paths for Mobile Communication and Positioning

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Vortrag im Rahmen des Institutskolloquiums
Mittwoch, 29. Oktober, 17:15 Uhr
Seminarraum (Raum 144), Institut für Statistik

Mobile communications and navigation are applications used on a daily basis by many people all over the world. Both applications for a radio transmission have to cope with the wireless propagation channel which includes signal reflection, diffraction or scattering. These disturbing effects introduced by the wireless propagation channel need to be mitigated in the receiver in order to retrieve the correct information necessary for improved system performance. In order to mitigate the effects, advanced statistical signal processing algorithms are needed to estimate the wireless propagation channel based on a mathematical description.

In the presentation, we will describe the mathematical model of the propagation channel for single and multiple transmit and receive antennas used in the estimation procedure. In a first stage, we describe an estimator for a static scenario when the transmitter position, receiver position and the environment do not change. Then, going further, non-stationary of the wireless propagation channel is introduced and an estimator based on a Kalman filter for a moving receiver is given. At last, applications of the described algorithms are presented.