

## Adaptive Resource Allocation Schemes in MIMO-OFDM based Cellular Communication Systems



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Cuvillier Verlag Nov 2007, 2007. Taschenbuch. Condition: Neu. Neuware - In this thesis, novel concepts of an adaptive resource allocation in an OFDM-based cellular network are considered. The approach of self-organised beamforming and opportunistic scheduling (SOBOS) is investigated, where in each cell the resource assignment is carried out autonomously and independently on the basis of SINR measurements. On the physical (PHY) layer, the use of multiple antennas (MIMO) is assumed. As an extension of the original opportunistic beamforming approach, the self-organised beamforming principle is analysed, where well-defined grids of beams (GoBs) are applied to provide coverage in the cellular network. This technique does not rely on any form of direct channel knowledge. Different methods for generating beams and composing the corresponding grids are taken into account. It is shown that by this beamforming technique, a good coverage of the network can be achieved. Using multiple beams in one GoB, the system goodput can be increased, leading to a hybrid TDMA/FDMA/SDMA scheme. The self-organised beamforming approach is shown to provide sufficient variations of the channel over time, frequency, and space, so that multiuser diversity can be exploited. The resources (time-frequency blocks) of the OFDM system can be assigned to users when their channel conditions are at their peak. On top of beamforming, different scheduling algorithms are considered for adaptive resource allocation on the DLC layer. Following the approach of cross-layer design, the scheduler is fed with detailed information of the current channel state for each user and each resource. For that purpose, a measurement model is applied which takes all SINR values of the resource to derive a good estimate of the expected channel quality (Packet Error Rate). With the help of this estimate, resource allocation and PHY mode selection can be carried out. The performance of the scheduling algorithms is...



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