

Dynamic Resource Allocation in Wireless Fading Channels



Rui Zhang

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A Convex Optimization Approach



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著者:Rui Zhang

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This dissertation looks at the problem of dynamic resource allocation (DRA) in both single-user and multi-user wireless fading channels. This dissertation investigates various key issues on implementation of DRA in wireless systems, such as delay constraint, algorithm complexity, feedback overhead, transceiver structure, and fairness between users, among others. This dissertation demonstrates the usefulness of convex optimization techniques for solving DRA problems in wireless fading channels. First, this dissertation studies the capacity limits and power-control policies for the single-user fading channel. Second, for the MIMO-OFDM channel, this dissertation presents a closed-loop extension of the well-known vertical Bell Labs layered space-time (V-BLAST) architecture whereby the receiver jointly optimizes the power and rate assignments for transmit antennas and then returns them to the transmitter. Third, this dissertation investigates the information-theoretic limits of multiuser, fading, multiple-access channel (MAc). This dissertation draws an interesting dual relationship between power and capacity regions of Gaussian MAC.

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