Spectral and Energy Efficiency Analysis for SLNR Precoding in Massive MIMO Systems with Imperfect CSI

ABSTRACT

We derive tractable bound expressions on achievable spectral efficiency (SE) for a multiple-input multiple-output (MIMO) system with a signal-to-leakage-plusnoise ratio precoding scheme (SLNR-PS) under the condition of imperfect channel state information. These bounds are tight and approach exact values when the number of base station (BS) antennas is large. A problem of energy efficiency (EE) maximization is investigated by using a practical power consumption model. The effects of the system parameters and quality of channel estimation including the number of BS antennas, transmit power and training length on the performance metrics are explicitly analyzed. Following that, an alternating optimization algorithm is employed to obtain the optimum EE. It has been shown that the proposed SLNR-PS performs better than matched-filtering and zero-forcing schemes and a deployment of massive MIMO with the optimal transmit power and training length can achieve high EE.

EXISTING SYSTEM

- In existing system, a generic power allocation, the leakagebased solution of user-allocated power and an arbitrary phase shift.
- For the massive MIMO system, a lower bound on the average SLNR has been derived by employing the Mullen's inequality over a Ricean fading channel.
- Moreover, a two-stage beamformer design including an ZFbased inner beamforming and a SLNR-based outer beamforming has been proposed.

PROPOSED SYSTEM

- An alternating optimization algorithm has been adopted to achieve the global optimum EE based on the optimal values.
- By applying a realistic power consumption model, a reliable EE maximization problem of SLNR-PS is formulated in a time-division duplexing (TDD) protocol.
- This provides an approach to achieve the optimum energy efficiency of SLNR-PS by using a standard alternating optimization algorithm.

SYSTEM REQUIREMENTS

HARDWARE REQUIREMENTS

- •Processor Intel core i3
- •RAM 2B
- •Hard Disk 20 GB

SOFTWARE REQUIREMENTS

- •Operating System : LINUX
- •Tool : Network Simulator-2
- •Front End : OTCL (Object Oriented Tool Command Language)

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