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Layered Random Beamforming OFDMA with Fair Scheduling Algorithms

Introduction

- In a multi-user environment, combining MIMO layered random beamforming (LRB) technique and OFDMA is capable of achieving near maximal benefits from MIMO and multi-user diversity whilst requiring minimal feedback.
- 3 dynamic scheduling algorithms are proposed for LRB-OFDMA and they show a trade-off between maintaining fairness and minimising delay.

Physical Layer Model of LRB-OFDMA

- Low Feedback Compared to Eigenbeamforming: LRB-OFDMA only requires the feedback of ESINR based data rate from every cluster of sub-carriers of each spatial layer of MIMO channels.
- Multi-user Diversity Gain: Achieve spatial multiplexing gain, spatial multi-user diversity gain and spectral multi-user diversity gain.

PHY Parameters and Transmission Modes

Performance of LRB-OFDMA in Statistical Channel

Performance of LRB-OFDMA in Ray Tracing Channel

Conclusions

- A greedy algorithm, a proportional fair algorithm and a fair cluster algorithm considered for LRB-OFDMA are shown to have increasing fairness.
- For PFA, increasing the window length improves the overall throughput performance but degrades the fairness.
- The FCA achieves a good balance between the overall throughput and both short and long term fairness. However, overall throughput is degraded while maintaining a fair resource allocation as the difference in fading statistics of MSs becomes more significant.

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