Group-Blind Detection for Uplink of

Massive MIMO Systems

Abstract:

When paired with traditional channel estimation and detection, massive MIMO is severely affected by pilot contamination. While sticking to the traditional structure of the training phase, where orthogonal pilot sequences are reused in different cells, we propose a group-blind detector that takes into account the presence of pilot contamination. Our detector uses the excess antennas to partially remove interference during the data transmission phase. We derive asymptotic expressions for the SINR gain and the achievable rate in the massive regime, i.e., when the number of antennas tends to infinity while keeping the number of users per cell fixed. Implementing the group-blind detector requires an estimate of the aggregate out-of-cell channel covariance. We propose a simple scheme, referred to as method of silences, to obtain such estimate. Numerical results confirm our analysis in practical scenarios, and show cases where the method of silences achieves a large fraction of the promised SINR gain over conventional detectors.