

**SUM-RATE ANALYSIS FOR MASSIVE MIMO DOWNLINK
WITH JOINT STATISTICAL BEAMFORMING AND USER
SCHEDULING**

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ABSTRACT

- Statistical beamforming is an important technique for multi-user massive MIMO downlink since it depends on the downlink channel covariance only. In this paper, we first derive an explicit analytical sum-rate expression for generic channel covariance based beamforming scheme.
- Then, a low-complexity joint statistical beamforming and user scheduling algorithm via greedy search is proposed, where the beamforming is based on the signal-to-leakage-and-noise-ratio (SLNR) for closed-form design and tractable analysis, while the user scheduling is based on the derived sum-rate expression.

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- Further, with the help of large-scale asymptotic simplifications and the introduction of the interference user number parameter, a simple analytical sumrate expression of the joint algorithm is derived for channels with flat power beam spectrum (PBS).
- The expression explicitly exhibits the sum-rate behaviour with respect to different network parameters and captures the effect of sum-rate-based user scheduling. Finally, simulation results are provided to verify our analytical results and to show the advantage of the proposed joint design compared with existing schemes.



EXISTING SYSTEM

- A major one is the acquirement of instantaneous channel state information (CSI) at the massive MIMO base station (BS) in the downlink.
- In conventional MIMO, the BS can acquire instantaneous CSI via limited feedback in frequency-division duplexing (FDD) or leveraging channel reciprocity in time-division duplexing (TDD) . Unfortunately, these schemes are difficult for massive MIMO due to the large amount of pilot or feedback overhead.

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PROPOSED SYSTEM

- This paper is on the joint design of SBF and user scheduling for multi-user massive MIMO downlink (where a BS equipped with a massive antenna array transmits information to multiple single-antenna users) as well as the performance analysis of the proposed scheme.
- First, an explicit analytical sumrate expression for SBF with a generic channel covariance is derived. Then a joint SBF and user scheduling algorithm is proposed, where the SLNR is used in the SBF design to balance the performance and complexity and the user scheduling takes advantage of the derived sum-rate expression to directly maximize the system sum-rate via greedy search.



HARDWARE REQUIREMENTS

- Processor - Pentium-IV
- Speed - 1.1 Ghz
- RAM - 256MB(min)
- Hard Disk - 20 GB
- Key Board - Standard Windows Keyboard
- Mouse - Two or Three Button Mouse
- Monitor - SVGA

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SOFTWARE REQUIREMENTS

- Tool - Network Simulator-2
- Operating system - LINUX
- Front end - OTCL (Object Oriented Tool Command Language)

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