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IEEE Journal of Selected Topics in Signal Processing Special Issue on Signal Processing for Large-Scale MIMO Communications

Recently, large-scale or massive MIMO techniques have been proposed to tremendously improve the performance of wireless networks. For networks with massive MIMO, base stations are equipped with a very large number of antennas, possibly tens to hundreds of antennas communicating with multiple users on the same frequency band simultaneously. When the number of antennas grows very large or tends to infinity, the effects of noise and fast fading vanish and intra-cell interference can be mitigated using simple linear precoding and detection methods. Large-scale MIMO, therefore, is becoming an increasingly important technique for wireless communications. To practically implement such large-scale MIMO techniques, several critical issues must be addressed, such as channel estimation and efficient modulation design. In traditional MIMO systems, OFDM-based estimation and transmission is used. However, as the number of antennas at the base station grows large, the computational complexity of OFDM increases dramatically. Other practical issues, such as low-complexity precoding, detection algorithms and energy-efficient designs, should be investigated. In multi-cell large-scale MIMO systems, the pilot contamination issue is a bottle-neck. Efficient signal processing and scheduling schemes are needed to conquer this problem. Issues regarding cell size design and network planning should be also considered.

With large-scale MIMO systems, a number of paradigm-shifting technical approaches can be expected. This special issue will focus on signal processing issues for practical design of large-scale MIMO networks. The objective of this special issue is to bring together the state-of-art research results and industrial applications. Original contributions, which are previously unpublished and not currently under review by another journal, are solicited in relevant areas including (but not limited to) the following:

- Efficient channel estimation for large-scale MIMO systems
- Low-complexity modulation design for large-scale MIMO systems
- Practical precoding design for large-scale MIMO systems
- Effective detection algorithms for large-scale MIMO systems
- Mitigating pilot contamination in multi-cell large-scale MIMO systems
- Energy-efficient signal processing for large-scale MIMO systems
- Joint PHY-MAC layer transmission schemes for large-scale MIMO systems
- Distributed large-scale MIMO system design
- Practical network planning and optimization for large-scale MIMO systems
- Applications of large-scale MIMO techniques
- Metrics and methodologies for evaluating large-scale MIMO system performance
- Limitation of large-scale MIMO systems

Prospective authors should visit <http://www.signalprocessingsociety.org/publications/periodicals/jstsp/> for information on paper submission. Manuscripts should be submitted using the Manuscript Central system at <http://mc.manuscriptcentral.com/jstsp-ieee>. Manuscripts will be reviewed via the standard IEEE process according to the following timetable:

- Manuscript submission due: September 15, 2013, **Extended to September 29, 2013**
- First review due: December 1, 2013
- Revised manuscript due: January 1, 2014
- Second review due: March 1, 2014
- Final manuscript due: April 1, 2014

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