Notice and Invitation

Oral Defense of Master's Thesis

The Volgenau School of Engineering, George Mason University

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Receiver Design for Massive MIMO Wireless Systems

Friday, December 8, 2017, 1:00 PM – 2:30 PM

Engineering Building, Room 3507

Committee

Dr. Zhi Tian, Thesis Director

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Abstract

Massive multiple-input multiple-output (MIMO) systems that employ a large number of antennas at both receiver and transmitter have been widely considered for adoption in next generation (5G) wireless networks. The deployment of massive MIMO promises to enhance the received signal power for communications over millimeter wave (mmWave) spectrum, which in turn increases the throughput and system efficiency. Notwithstanding with the advantages of massive MIMO, several major technical challenges arise, which include the difficulty and complexity in hardware implementation, precoder design and channel estimation. In this thesis, we mainly focus on channel estimation strategies that address the training overhead issue for mmWave massive MIMO systems. By utilizing the sparsity feature in the angular domain of mmWave channels, we propose a gridless compressive sensing (CS) technique based on atomic norm minimization (ANM). Particularly for massive MIMO systems involving two-dimensional angle estimation, we develop a decoupled ANM (D-ANM) approach that offers high-accuracy channel estimation at low-complexity and little training overhead. The proposed D-ANM approach is applied to mmWave massive MIMO systems with uniform rectangular array employed at base station and extended to the multi-user case. Investigation on the use of D-ANM for channel estimation in wideband mmWave SIMO-OFDM systems is also carried out to cope with frequency selective channel fading.