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学 位 論 文 の 内 容 の 要 約
Summary of doctoral dissertation content

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学位の種類 Doctoral degree	博士（工学）
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【論文の内容の要約】[Summary of the contents of the doctoral dissertation]

However attaching massive number of antennas at the base station (BS) for the fifth generation (5G) communications and beyond acquires a great deal of attentiveness, it comes at the expense of the practical implementation (e.g. power consumption, hardware cost). The low-resolution analog-to-digital/digital-to-analog converters (ADCs/DACs) offer an auspicious settling for the massive antenna systems practical impediments. Employing the low-resolution ADC at the BS in the uplink can reduce the power consumption, the hardware complexity and the cost. However, the systems with low-resolution ADCs (i.e., 1 to 3-bit ADCs) suffer from the nonlinearity and the performance degradation. In this thesis, we investigate a transmitter and receiver design for a single-user (single-input) massive output (multi-output), massive SIMO, with higher-order modulation (e.g., 16-quadrature amplitude modulation (16-QAM)) and 1-bit analog-to-digital converters (ADCs) adopted at the base station (BS). For the channel estimation and signal detection, the linear least-squares (LS) channel estimation and optimal maximum ratio combining (MRC) are employed, respectively. First, we introduce closed-form formulas for the mean and covariance and/or correlation matrix of the estimated symbols by considering the effect of the 1-bit ADCs. The distribution of the estimated symbols is then accurately provided by taking into account the impact of the 1-bit ADCs. The analysis indicates that the conventional 16-QAM detector and the typical square 16-QAM constellation are not appropriate for the massive SIMO system with 1-bit ADCs. Then, we propose three different symbol detectors based on the statistical information of the estimated symbols. In addition,

we re-design the transmitted constellation symbols of the 16-QAM modulation for the massive SIMO system with 1-bit ADCs case. The upper bound on the symbol error rate (SER) is analyzed based on the pair-wise error probability.