Cost Analysis of Channel Estimation in MIMO-OFDM for Software Defined Radio

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Abstract

Channel State Information (CSI) is critical for the overall performance of wireless systems. Meanwhile, the estimation of CSI forms one of the most intensive tasks in radio baseband signal processing. This paper investigates the real-time implementation of channel estimation for MIMO-OFDM systems using programmable hardware aimed for software defined radio. Based on the programmable hardware architecture proposed by us, several prevalent channel estimation methods such as Least Square (LS), Minimum Mean Square Error (MMSE) and Pilot-Symbol-Aided (PSA) are evaluated from both the performance and computational latency perspectives. By utilizing the symmetric feature of the covariance matrix, a simplified two-sided Jacobi rotation method is adopted to speed up the complex-valued singular value decomposition involved in the MMSE channel estimation**.**