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Intelligent conventional and proposed hybrid 5G detection techniques

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Abstract In recent years, Multiple Inputs and Multiple Outputs (MIMO) have gained significant attention due to their characteristics such as spectral gain, high throughput, and energy efficient. It is seen as one of the integral parts and backbone of the Fifth Generation (5G) and beyond 5G (B5G). However, the use of a large number of antennas requires complex algorithms to detect the received signal. Though, several detection methods have been proposed which can efficiently enhance the Bit Error Rate (BER) gain of the framework, it also increases the computational complexity. The proposed article introduces a hybrid algorithm for different sizes of MIMO. The hybrid algorithm is designed by combining QR Decomposition M−algorithm−Maximum Likelihood Detection (QRM-MLD) and Beam Forming (BF). Further, we compare the performance of proposed hybrid algorithms with that of conventional algorithms, namely Zero Forcing (ZF), Minimum Mean Square Error (MMSE), Successive over Relaxation (SOR), Gauss Seidel Detector (GSD), Jacobi Scheme (JS), and Approximate Message Passing (AMP). In computer simulation, it is noted that the proposed algorithm outperforms the conventional detection algorithms with minimum computational complexity.

1. Introduction

In the last year, it has become clear that the demands for high data rates and low latency in cellular transmission are increasing day by day. The average growth rate of data consumption has increased every 1.6 years. However, the current trend

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