Complexity Reducing QRD-MLD with Sequential Decision Based on Estimated Noise Variance

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Abstract— In MIMO systems, maximum likelihood decoding (MLD) shows the best performance of all kinds of detections. However, the complexity of MLD exponentially increases with increasing the number of antenna branches and constellation size. Accordingly, it is impractical to use a full MLD without reducing its computational complexity, because it would be prohibitively large to implement. Recently, the use of QR decomposition with an M-algorithm (QRM-MLD) has been proposed to reduce the system complexity while maintaining the performance of the system. However, QRM-MLD performance depends on the surviving symbol replica candidates. To reduce this problem, in this paper, we propose the complexity reducing QRM-MLD with threshold method using the estimated noise variance. The proposed method shows the superior performance while maintaining the low complexity. From the simulation results, the proposed method achieves 1/10 complexity reduction compared with a full MLD for the threshold index k_{th}=3.3.

Keyword—MIMO, MLD, QRM-MLD

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