Introducing Dual Regularization Parameters into Regularized Channel Inversion (RCI)-Based Vector Perturbation for Modulo Loss Reduction

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***Abstract*—This paper proposes a method to reduce the symbol error caused by modulo operator for regularized channel inversion (RCI)-based vector perturbation (RCI-VP). The proposed method introduces dual regularization parameters of RCI precoding matrix. First regularization parameter α_1 is set so as to maximize the signal to interference plus noise ratio (SINR) value of each stream to find the optimal perturbation vector. The second regularization parameter α_2 is set so as to minimize the total MSE between the transmitted perturbation vector and received perturbation vector to reduce the symbol error caused by modulo operator. The simulated results confirm that the proposed method can improve the performance of RCI-VP over *i.i.d.* MIMO channel and frequency-selective fading MIMO channel.**

***Keyword*—Vector perturbation, SINR maximization, Modulo loss, Regularization parameter, Minimum mean square error**

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