Discrete Rate Maximisation Power Allocation with Enhanced BER

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Abstract

This study aims to maximise the rate over a multiple-in multiple-out (MIMO) link using incremental power and bit allocation. Two different schemes, greedy power allocation (GPA) and greedy bit allocation (GBA), are addressed and compared with the standard uniform power allocation (UPA). The design is constrained by the target bit error ratio (BER), the total power budget and fixed discrete modulation orders. The authors demonstrate through simulations that GPA outperforms GBA in terms of throughput and power conservation, whereas GBA is advantageous when a lower BER is beneficial. Once the design constraints are satisfied, remaining power is utilised in two possible ways, leading to improved performance of GPA and UPA algorithms. This redistribution is analysed for fairness in BER performance across all active subchannels using a bisection method.