Suboptimal Greedy Power Allocation Schemes for Discrete Bit Loading

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Abstract

We consider low cost discrete bit loading based on greedy power allocation (GPA) under the constraints of total transmit power budget, target BER, and maximum permissible QAM modulation order. Compared to the standard GPA, which is optimal in terms of maximising the data throughput, three suboptimal schemes are proposed, which perform GPA on subsets of subchannels only. These subsets are created by considering the minimum SNR boundaries of QAM levels for a given target BER. We demonstrate how these schemes can significantly reduce the computational complexity required for power allocation, particularly in the case of a large number of subchannels. Two of the proposed algorithms can achieve near optimal performance including a transfer of residual power between subsets at the expense of a very small extra cost. By simulations, we show that the two near optimal schemes, while greatly reducing complexity, perform best in two separate and distinct SNR regions.

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