Bat pack algorithm for dynamic resource allocation in OFDMA systems

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Abstract: Orthogonal frequency division multiple access (OFDMA) is one of the most popular access schemes adopted in recent wireless systems including, but not limited to, 4G-LTE. Consequently, OFDMA resource allocation raises as one of the key research topics since the capacity and quality of service depend on optimising the usage of the available resources. Resource allocation of OFDMA systems relies on power and subcarrier allocations of each user for different operational scenarios and channel conditions. In this paper, we propose and implement bat pack algorithm (BPA) to find the optimal, or near optimal, power and subcarrier allocations for OFDMA systems. The proposed algorithm considers power and subcarrier allocation constrains, channel and noise distributions, distance between user equipment and base station, user priority weight. Four cases are addressed, simulated, and analysed employing the BPA algorithm under specific operational scenarios to meet the standard specifications of current communication systems.

Keywords: resource-adaptive systems; bat algorithm; bat pack algorithm; BPA; OFDMA; optimisation algorithm; dynamic resource allocation; communication systems performance; mobile network design.

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