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Load-driven resource allocation for enhanced interference mitigation in cellular networks

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Abstract

Cellular users are often considered to be uniformly distributed within the communication network for the purposes of simplified analysis. Based on this assumption, the inter-cell interference experienced by users has been handled using soft frequency reuse (SFR) techniques. However, in real networks, the distribution of users in the network regions are not uniform. Therefore, analysis for random deployment of users under SFR is essential for improved accuracy of analysis and better handling of interference. This research presents an SFR algorithm (Load-Driven SFR) that intelligently adjusts resource allocation parameters (base station bandwidth assignment) according to the load distribution in the network. Interference mitigation is enhanced and Load-Driven SFR outperforms several implementations of the standard SFR algorithm using fixed bandwidth allocation, especially for edge user's SINR (up to 3.2% improvement) and edge user's Capacity (up to 202% improvement).