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Balancing the Load in LTE Urban Networks via Inter-Frequency Handovers

Mobile traffic is commonly time variant and often unbalanced, consequently, a sudden increase in traffic within a cell can imbalance the system in such a way that hugely deteriorates network performance. The main purpose of this thesis is to analyse the impact of balancing the load via inter-frequency handovers in an LTE heterogeneous urban network. The effect of varying some parameters regarding user density was studied, as well as combination of different frequency bandwidths and service profile, among others, addressing the 800, 1 800 and 2 600 MHz bands. A model was developed, and implemented in a simulation environment, which takes a certain distribution of users into account and makes the allocation of resources depending on system coverage and available capacity, replicating as close as possible the behaviour of a real network. The analysis on users' density supports the view that only makes sense to apply load balancing methods at a certain load in the system. Results show high standards of QoS, since, for the same service, users experience similar throughputs within each other. In addition, voice users never suffer handovers due to load balancing (the assigned priority reduces the probability of drop calls). The model shows that, depending on network conditions, the gain in throughput can reach up to 8%. The variation of throughput thresholds has more impact on the percentage of users that perform handovers, and therefore, in the gain of the system.

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