

Joint Interference Coordination and Load Balancing for OFDMA Multihop Cellular Networks

Abstract:

Multihop cellular networks (MCNs) have drawn tremendous attention due to its high throughput and extensive coverage. However, there are still three issues not well addressed. With the existence of relay stations (RSs), how to efficiently allocate frequency resource to relay links becomes a challenging design issue. For **mobile** stations (MSs) near the cell edge, cochannel interference (CCI) become severe, which significantly affects the network performance. Furthermore, the unbalanced user distribution will result in traffic congestion and inability to guarantee quality of service (QoS). To address these problems, we propose a quantitative study on adaptive resource allocation schemes by jointly considering interference coordination (IC) and load balancing (LB) in MCNs. In this paper, we focus on the downlink of OFDMA-based MCNs with time division duplex (TDD) mode, and analyze the characteristics of resource allocation according to **IEEE** 802.16j/m specification. We also design a novel frequency reuse scheme to mitigate interference and maintain high spectral efficiency, and provide practical LB-based handover mechanisms which can evenly distribute the traffic and guarantee users' QoS. Our study shows that our scheme not only meets the requirement on coverage, but also improves the throughput while accommodating more users in MCNs.