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Novel Channel-Hopping Schemes for Cognitive Radio Networks

Abstract:

Recently, cognitive radio (CR) has become a key technology for addressing spectrum scarcity. In CR networks, spectrum access should not interfere the colocate incumbent networks. Due to the requirement above, common control channel approaches, which are widely used in traditional multichannel environments, may face serious CR long-time blocking problem and control channel saturation problem. Although channel-hopping-based approaches can avoid these two problems, existing works still have significant drawbacks including long time-to-rendezvous, unbalance channel loading, and low channel utilization. In this paper, we introduce three channel-hopping approaches, RCCH, ARCH, and SARCH for synchronous and asynchronous environments, respectively. Compared with previous works, our schemes outperform the state of the art in terms of these metrics.