

A femtocell cross-tier interference mitigation technique in OFDMA-LTE system: a cuckoo search based approach

ABSTRACT

Background/Objectives: In wireless broadband access networks, most indoor environments encounter serious coverage problem. Femtocells have been introduced as an efficient solution to improve cell coverage, enhance area spectral-efficiency and provide better Quality-of-Service (QoS) to mobile users. However, cross-tier interference issues continue to be the major technical challenge associated with femtocell deployment. **Methods/Statistical analysis:** This study introduce a resource allocation technique-based cuckoo search algorithm RACSA for cross-tier interference mitigation in Orthogonal Frequency Division Multiple Access based Long Term Evolution (OFDMA-LTE) system. The innovative RACSA technique takes upon itself the task of maximizing the throughput of network according to a specified threshold for the interference. Cuckoo search Algorithm is extensively employed to successfully address the problem of resource optimization by finding and allocating the suitable power and bandwidth for all the users and this ultimately, leads to mitigating the cross-tier interference for OFDMA macro-femtocell networks. **Results/Conclusions:** The simulation results reveal that RACSA mitigate the cross-tier interference and improve the system performance. In addition, an assessment is carried out and it confirmed that RACSA gives (38%) and (21%) higher system throughput and (14%) and (35%) higher in spectral efficiency and (55%) and (33%) lower in the outage probability when comparing with results of genetic algorithm and auction algorithm respectively.

Keyword: Cross-tier interference; Cuckoo search approach; Femtocell; Interference mitigation; Resource allocation; OFDMA-LTE; RACSA