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A Novel HGBBDSA-CTI Approach for Subcarrier Allocation in Heterogeneous Network (Article)

Hasan, M.K.^{a,b}, Ismail, A.F.^b, Islam, S.^c, Hashim, W.^d, Ahmed, M.M.^a, Memon, I.^e

^aDepartment of Electrical and and Electronics Engineering, Universiti Malaysia Sarawak (UNIMAS), Kota Samarahan, Sarawak 94300, Malaysia

^bDepartment of Electrical and Computer Engineering, International Islamic University Malaysia, Kuala Lumpur, 50728, Malaysia

^cDepartment of Computer Science and Engineering, Green University of Bangladesh, Dhaka, Bangladesh

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Abstract

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In recent times, Heterogeneous Network (HetNet) achieves the capacity and coverage for indoors through the deployment of small cells i.e. femtocells (HeNodeBs). These HeNodeBs are plug-and-play Customer Premises Equipment's which are associated with the internet protocol backhaul to macrocell (macro-eNodeB). The random placement of HeNodeBs deployed in co-channel along with macro-eNodeB is causing severe system performance degradation. Thereby, these HeNodeBs are suggested as the ultimate and the most significant cause of interference in Orthogonal Frequency-Division Multiple-Access based HetNets due to the restricted co-channel deployment. The CTI in such systems can significantly reduce the throughput, and the outages can rise to the unacceptable limit or extremely high levels. These lead to severe system performance degradation in HetNets. This paper presents a novel HGBBDSA-CTI approach capable of strategically allocate the subcarriers and thereby improves the throughput as well as the outage. The enhanced system performance is able to mitigate CTI issues in HetNets. This paper also analyses the time complexity for the proposed HGBBDSA algorithm and also compares it with the Genetic Algorithm-based Dynamic Subcarrier Allocation (DSA), and Particle Swarm Optimization-based DSA as well. The key target of this study is to allocate the unoccupied subcarriers by sharing among the HeNodeBs. The reason is also to enhance the system performance such as throughput of HeNodeB, the average throughput of HeNodeB Users, and outage. The simulation results show that the proposed HGBBDSA-CTI approach enhances the average throughput (92.05 and 74.44%), throughput (30.50 and 74.34%), and the outage rate reduced to 52.9 and 50.76% compare with the existing approaches. The result also indicates that the proposed HGBBDSA approach has less time complexity than the existing approaches. © 2018, Springer Science+Business Media, LLC, part of Springer Nature.

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Topic: Femtocell | Heterogeneous networks | femtocell network

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- Co-tier interference
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- Heterogeneous network
- OFDMA resource optimization
- Subcarrier allocation

Indexed keywords

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Engineering controlled terms: Complex networks Computational complexity Genetic algorithms Heterogeneous networks Mobile telecommunication systems Multiple access interference Orthogonal frequency division multiplexing Particle swarm optimization (PSO) Throughput

Engineering uncontrolled terms: Co-tier interferences Customer premises equipment Dynamic subcarrier allocations Heterogeneous Network (HetNet) Orthogonal frequency division multiple access Resource optimization Sub-carrier allocation System performance degradation

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