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An Enhanced Dynamic Spectrum Allocation Method on Throughput Maximization in Urban 5G FBMC Heterogeneous Network

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Abstract

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Abstract

Reports have shown that the demand for data managed by wireless systems is expected to grow by more than 500 exabytes by 2025 and beyond. 5G networks are predicted to meet these demands, provided that the spectrum resources are well managed. In this paper, an enhanced dynamic spectrum allocation (E-DSA) method is proposed, which incorporates a cooperative type of game theory called the Nash bargaining solution (NBS). It was assumed that there is one primary user (PU) and two secondary users (SU) in the network and their spectrum allocation was analyzed by testing the validity of the algorithm itself by using price weight factors to control the costs of the spectrum sharing. The solution was established by combining a proposed multiplexing method called the Filter Bank Multicarrier (FBMC) for 5G configuration, with the E-DSA algorithm to maximize the throughput of a heterogeneous 5G network. It was shown that the throughputs for 5G with E-DSA implementation

were always higher than those of the ones without E-DSA. The simulation was done using the LabVIEW communication software and was analyzed based on a 5G urban macro and micro network configuration to validate the heterogeneity of the network. © 2023 Published by IRCS-ITB.
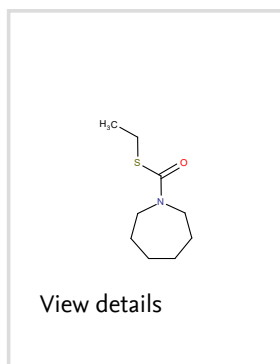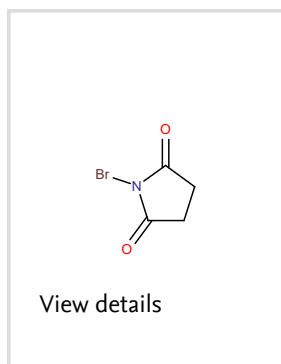
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Enhanced Dynamic Spectrum Allocation (E-DSA);   Filter Bank Multicarrier (FBMC);   heterogeneous network;   Nash Bargaining Solution (NBS);   Offset Quadrature Amplitude Modulation (OQAM)

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