

## **Power Allocation Algorithm for Orthogonal Frequency Division Multiplexing Based Cognitive Radio Networks**

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**Abstract :** Cognitive radio (CR) is the promising technology that addresses the spectrum scarcity problem for future wireless communications. Orthogonal Frequency Division Multiplexing (OFDM) technology provides more power band ratios for cognitive radio networks (CRNs). While CR is a solution to the spectrum scarcity, it also brings up the capacity problem. In this paper, a novel power allocation algorithm that aims at maximizing the sum capacity in the OFDM based cognitive radio networks is proposed. Proposed allocation algorithm is based on the previously developed water-filling algorithm. To reduce the computational complexity calculating in water filling algorithm, proposed algorithm allocates the total power according to each subcarrier. The power allocated to the subcarriers increases sum capacity. To see this increase, Matlab program was used, and the proposed power allocation was compared with average power allocation, water filling and general power allocation algorithms. The water filling algorithm performed worse than the proposed algorithm while it performed better than the other two algorithms. The proposed algorithm is better than other algorithms in terms of capacity increase. In addition the effect of the change in the number of subcarriers on capacity was discussed. Simulation results show that the increase in the number of subcarrier increases the capacity.

**Keywords :** cognitive radio network, OFDM, power allocation, water filling

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