

ABSTRACT

Heterogeneous networks (HetNets) are introduced by the Third Generation Partnership Project (3GPP) as an emerging technology to enhance network coverage and improving system performance. HetNets in this work propose the combination of two-tier network of macrocell and femtocell. Femtocell is deployed inside the area of an existing macrocell network. Femtocell is the promising key to extend the indoor coverage and capacity to response demand for the end-user. However, in dense deployment area of femtocell networks and located inside macrocell network, users may suffer significant critical both cross-tier and co-tier interference. The high interference is because of unsuitable resource block (RB) allocation for femto user equipment (FUEs), which causes directly the decrease signal to interference plus noise ratio (SINR) values.

The main objective of this work is to propose discretely modify firefly algorithm (DFA) to maximize the SINR values for each FUEs in femtocell networks. Therefore, in order to achieved optimal SINR values, DFA optimization is assigned RB allocation for each FUEs to obtain the appropriate RB, leading to decrease in the amount of interference values. Firefly algorithm was developed by Dr Xin-She Yang which he has inspired by the flashing light of firefly insect in nature. Through the simulation result, our proposed algorithm achieved significant performance and outperforms the random allocation scheme. Interference and SINR illustrate in cumulative distribution function (CDF) which show that the proposed algorithm achieved efficiency performance with minimizing interference and improving the SINR up to 3.57 % from discrete bacterial foraging (DBFO) and up to 18.48 % from random allocation.

Keywords: Heterogeneous Network, Resource Allocation, Firefly algorithm