

ABSTRACT

The development of cellular communication continues to increase in line with the needs of the community, it causes traffic loads on *evolved Node B* (eNB) due to the large number of network users. Communication *Device to Device* (D2D) is a solution to the problems that occur, in D2D communication *device* that can communicate with each other directly without going through eNB. In D2D communication using the same spectrum as *Cellular User Equipment* (CUE) which can increase efficiency between CUEs but can cause interference between the two users therefore to reduce interference between *Cellular User Equipment* (CUE) and *D2D user Equipment* (DUE) by allocating resources appropriately.

In this study, allocate *resource* to overcome interference problems by using the *Simple Particle Swarm Optimization* (SPSO) algorithm and the *Greedy* algorithm as a comparison to determine the value of the performance parameters, using a cell system model. single and directional communication *uplink*. In this study using a scenario of the iteration process in the SPSO algorithm, the iterations used are 30, 50 and 200.

Based on the results of the scenarios that have been used, the SPSO algorithm is able to provide good performance parameters compared to the *Greedy* algorithm, in 200 iterations the SPSO algorithm produces the best performance parameters with a value of *sumrate* 1.3310×10^8 bps with a difference 0.01% from the *Greedy* algorithm that is 1.3211×10^8 bps, 12.3239 bps/Hz spectral efficiency with a difference of 0.09% from the *Greedy* algorithm that is 12.2328 bps/Hz, power efficiency 2.1285×10^3 bps/mWatt with a difference of 0.02% from the *Greedy algorithm* that is 2.1125×10^3 bps/mWatt, Value of *fairness* in 200 iterations the *Greedy* algorithm has better performance at 0.91% for *fairness* CUE , 0.99% for *fairness* D2D and 0.92% for *fairness* total.

Keywords : *SPSO Algoritih, Device to Device, Greedy Algorithm, Resource Allocation*