

## ABSTRACT

*In cellular networks capacity will always be a major problem. The optimal distribution of bandwidth in the downlink system is vulnerable to cross layer interference. One technology that promises and becomes a trend in the future for this problem is Heterogeneous Network (HetNet). HetNet consists of a macro cell that transmits at a high power level which overlays a small cell in the form of a low power node (LPN).*

*In this research, HetNet macrocell-femtocell is proposed for downlink communication. The optimal power allocation process is carried out using the bat algorithm and compared with the greedy algorithm. From the proposed scheme then analyzed the performance parameters of sumrate, spectral efficiency, power efficiency, and fairness.*

*From the simulation results that have been carried out using the bat algorithm and the greedy algorithm, then an analysis is carried out based on the performance parameters. The simulation results of scenario 1 show that by using the bat algorithm the value of the sumrate, power efficiency, spectral efficiency has increased by 33.05%, while the fairness parameter has decreased when using the bat algorithm by 10.07%. In other words, the fairness parameter is superior when simulated using a greedy algorithm.*

**Kata Kunci :** *Heterogeneous Network, Macrocell , Femtocell, Bat Algorithm, Greedy Algorithm*