

## ABSTRACT

*As the development of human needs for wireless broadband communications, the technology that supports these needs also grow. Seeing facts, a wireless communication system will be faced with the problem of demand in capacity building, resource efficiency, enhanced Quality of Service (QoS), and optimization of energy efficiency, which is predicted by 2020 will increase the amount of traffic as much as 1000-fold. With the diversity of the channel conditions, one issue of resource utilization is to perform an efficient allocation.*

*In this final assignment, the usage of Ant Colony Optimization (ACO) algorithm for radio resources allocation in uplink LTE system is observed. ACO is metaheuristic algorithm that works based on ants' activity. These ants utilize the information of pheromones and heuristic values. Every ant moves in parallel condition to build the solution of resource block (RB) allocation for the users. Furthermore, these solutions will be evaluated by using a specific objective function.*

*Simulation of RB allocation is done using two scenarios, that is variation of ants number and number of iteration. From the simulation results, it's obtained that the increasing number of iteration can improve the average user throughput by 0.05%. The increasing number of ants can made fluctuating the average user throughput, but the improvement of average user throughput only takes effect in number of ants with range 10-40 ants. This is because the constant number of iteration, that is 80 times, is enough to yield the good-quality solution. Beside that, ACO is capable of making a good performance of fairness for two scenarios, that is 0,99985 or 99.985% fair. This is because ACO can allocate RBs to all users fairly.*

**Keywords:** *LTE, ant colony optimization, resource block, allocation, SC-FDMA*