

## ABSTRACT

*The development of cellular communication technology is increasing, and resulting in an increase in traffic density in a network. To overcome this problem, the communication concept used in 5G technology was developed, and it is known as Device-to-Device (D2D) communication. D2D communication is communication that allows User Equipment (UE) to communicate directly without going through the BS. However, this will cause interference, due to the use of the same Resource Block (RB) by Cellular User Equipment (CUE) and D2D Users Equipment (DUE).*

*In this study, simulations were carried out using a heuristic algorithm, and a greedy algorithm as a comparison algorithm with the aim of reducing interference that occurs during resource allocation. The algorithm was tested in two scenarios, namely variations in the number of D2D pairs, and variations in cell radius. The simulation scheme used to allocate resources is an underlay communication system with an uplink communication direction.*

*Based on the results of the simulation carried out using the heuristic algorithm and the greedy algorithm, it is found that the heuristic algorithm has better performance than the greedy algorithm. The average value of the sumrate heuristic algorithm is  $1.0187 \times 10^8$  bps, the average value of spectral efficiency is 10.1873 bps/Hz, the average value of power efficiency is  $6.0461 \times 10^3$  bps/mWatt, and the average value of D2D fairness is 0.9631, while the greedy algorithm is superior in the BS fairness value with an average value of 0.6926, and total fairness with an average value of 0.6713.*

**Keyword:** *resource allocation, device to device, algoritma heuristic, algoritma greedy.*