

## ABSTRACT

The fifth generation (5G) communication system demands higher performance than the previous generation. *Multiple Input Multiple Output* (MIMO) systems that have been implemented cannot meet the demand for large amounts of data. Therefore, the Massive MIMO system emerged as a solution to overcome the previous generation. The use of Massive MIMO makes it possible to create multiple beams so that the throughput can be increased more than the previous generation.

Base Station (BS) System cannot serve many users simultaneously. Therefore, the author proposes a user selection algorithm to achieve high spectral efficiency and low interference. The proposed algorithms are Capacity-Based User Selection, Frobenius Norm-based User Selection, and Chordal Distance User Selection (CDUS) that combined with the Round-Robin (RR) algorithm. These three algorithms still have issues in choosing unfair users. The RR algorithm is an algorithm that selects users based on the order of arrival. By combining the three algorithms above with the RR algorithm, the issues of the previous algorithm can be solved.

Based on the simulation, the user selection algorithm combined with the RR algorithm provides good performance in terms of throughput maximum using the Capacity-RR algorithm with a value of 16.4 bps/Hz and sumrate with variation of 128 trasmitter and 4 receivers with a value of 673 bps/Hz. The level of fairness in the CDUS-RR algorithm has a fairness index with a value of the average is 3.29, and the complexity of the CDUS-RR algorithm has an average runtime of 28.16 seconds. The results of this final project are expected to contribute to the development of user scheduling on Massive MIMO system that provide good fairness for each user with low complexity and at the same time provide a good average sumrate value.

**Keywords:** Massive MIMO, Capacity-Based User Selection, Frobenius Norm-based User, Chordal Distance User Selection, Round-Robin.