## ABSTRACT

In progressively growing at wireless mobile communication, one of them is GSM (Global System for Mobile Communication), then it's needed some developing technique to support their system in position and location users determination that more increasing. One of method that have developed is applied smart antenna in GSM communication system. To apply the smart antenna, it has two steps, those are DOA (Direction of Arrival) estimation and beamforming process

This final project investigates DOA (Direction of Arrival) estimation with ESPRIT (Estimation of Signal Parameters via Rotational Invariance Techniques) Algorithm and MVDR (Minimum Variance Distortionless Vector) Algorithm. The Analysis of this final project is focused in the effect of number of arrays, number of angles, SNR, and number of samples (waves) to accuracy, resolution, and calculation time and also make comparison between the algorithms.

From the simulation result, it has been earned that the increment of difference of number of arrays and number of angles, SNR, and number of waves, the accuracy both of algorithm will increase. For resolution, the increment of difference of number of array and number of angle and SNR, the resolution estimation will increase. The Calculation time will increase for the increment of number of arrays and number of samples, except for number of angles, it has only influenced a bit.

When ESPRIT Algorithm and MVDR Algorithm has been compared, from its accuration level the ESPRIT Algorithm has higher accuration level, that is  $\leq 0.05^{\circ}$  than MVDR Algorithm has  $\leq 0.5^{\circ}$  level accuration. From its resolution the ESPRIT Algorithm has higher minimum angle of arrival resolution than MVDR Algorithm. For high resolution result both of algorithm, should use number of element antenna bigger than twice of number of angle of arrival. In calculation time, calculation time for ESPRIT Algorithm more quickly than MVDR Algorithm.