

## **ABSTRACT**

*The Conventional Radar have to spin 360 degrees to detect the direction of arrival, so it is necessary a mechanic ability that gives a long enough delay. To solve this, there is a lot of ways to estimate the direction of arrival. The method that have developed is applied smart antenna in Radar 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. The Analysis of this final project is focused in the effect of correlation level of arrival signal to number of output angles and the effect of number of arrays, number of angles, SNR, and number of samples (waves) to accuracy, resolution, and calculation time. After that, it has been compared the performance of ESPRIT Algorithm and MUSIC Algorithm with the same focused analysis.*

*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 of ESPRIT Algorithm will increase. For resolution, the increment of difference of number of array and number of angle and SNR, the pre-resolution and minimum resolution of ESPRIT Algorithm 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 MUSIC (Multiple Signal Classification) Algorithm has been compared, the result is accuracy and resolution of ESPRIT Algorithm is higher than MUSIC Algorithm. For Calculation time, MUSIC Algorithm is higher than ESPRIT Algorithm for each calculation.*