ABSTRACT

ADCS (Attitude Determination and Control System) is one of the important systems in nano satellites. This system serves to control the attitude of nano satellites. The purpose of attitude control is to maintain the angular orientation. Usually reaction wheels or magnetic torque is used to control the nano satellites attitude.

In this final project the author will design and implement the ADCS of nano satellites using reaction wheels as actuators. The reason of choosing reaction wheels is because the reaction wheels more accurate to maintain the angular orientation compared with the magnetic torque. The spin of reaction wheels is used for moving the nano satellites until it reach the angle that set at first.

To get angle from nano satllites, used accelerometer and gyroscope sensor that combine using kalman filter. After getting good value from it, the data will be processed by the PID Controller to set the direction and speed of reaction wheels to maintain the angular orientation of nano satellites. From the experimental of Kalman filter and PID, obtained the optimal parameter values of Kalman filter are $Q\_accelerometer = 0.001$; $Q\_gyroscope = 0.003$ and $R\_pengukuran = 0.03$ and PID parameters are, $Kp = 4.0$; $Ki = 0.5$ and $Kd = 2.0$.

Keywords   : ADCS , Reaction Wheels, Kalman filter, PID.