INTISARI

IMPLEMENTASI SISTEM KONTROL *CASCADED – DISCRETE* PID PADA SUMBU *ROLL* DAN *PITCH QUADCOPTER*

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Quadcopter merupakan *Unmanaed Aerial Vehicle* (UAV) yang perkembangan teknologinya terus melesat. *Quadcopter* memiliki gerakan rotasi tiga sumbu yaitu *roll*, *pitch*, dan *yaw*. Dalam pengendalian gerak sumbu *roll* dan *pitch* memerlukan pendekatan sistem kontrol *cascade – discrete* PID. Proses perancangan sistem kontrol menggunakan hasil pembacaan sensor MPU6050 yang telah melalui proses filter menggunakan Kalman filter. Kontrol *cascade – discrete* PID. Hasil pemodelan sistem MATLAB menunjukkan sistem memiliki *settling time* sebesar 0 detik dan *overshoot* 1,54%. Hal ini mengindikasikan sistem dapat mencapai *steady state* dengan cepat dan stabil. Hasil implementasi sistem kontrol menunjukkan respons sistem yang baik pada sumbu *roll* dan *pitch* ketika mendapat gangguan dan tanpa gangguan untuk menuju stabil.

Kata kunci *:* *Quadcoter*, *Cascade*, *Discrete* PID, *Roll, Pitch*

ABSTRACT

Implementation of a Cascaded Control System – Discrete PID on the Roll and Pitch Axes of a Quadcopter.

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Quadcopter is an Unmanned Aerial Vehicle (UAV) whose technological development continues to advance rapidly. The quadcopter exhibits rotational movement along three axes: roll, pitch, and yaw. Controlling the roll and pitch axes requires a control system approach using cascaded discrete PID. The control system design process utilizes sensor data from the MPU6050, which has been processed through a Kalman filter. The cascaded discrete PID control system, modeled in MATLAB, shows a settling time of 0 seconds and an overshoot of 1.54%. This indicates that the system can quickly and stably reach steady-state conditions. The implementation results demonstrate good system response for roll and pitch axes under both disturbed and undisturbed conditions in achieving stability.

***Keyword** : Quadcoter*, *Cascade*, *Discrete* PID, *Roll, Pitch*