

UNIVERSITAS INTERNASIONAL BATAM

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IMPLEMENTATION OF HYBRID PID-FUZZY CONTROL METHOD FOR HOVERING CONTROL ON A QUADCOPTER

UAV PLANE

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ABSTRACT

Quadcopter is an unmanned aerial vehicle with 4 rotors and propellers on each side. All motions, positions and flying directions are controlled by the speed and direction of each rotor movement. Application of this quadcopter technology also varied, such as for distant aerial observation and militer duties. In the application of this technology, the balance of quadcopter is needed, four rotors will always be parallel to the horizontal plane. This condition is known as hovering control. Hovering control often got distractions from outside, among others is the dynamics of the plant tend to be complex. In this study used methods of Hybrid PID-Fuzzy control as its control system to achieve a balanced condition and resolve any distractions when hovering control happen for roll and pitch angles.

Hybrid PID-Fuzzy control is combination method of PID control (conventional PID) with output value generated from fuzzy logic control. Constants of K_p , K_i and K_d are used and added with fuzzy logic control using 25 rule evaluations. Percentage of each control is 90% for PID control and 10% for fuzzy logic control. With constant $K_p=6.62$, $K_i=0.85$, $K_d=5$ with 25 rule evaluations, this control can generate good response by reducing overshoot and provide better recovery time compared with conventional PID control. Implementation of Fuzzy-PID hybrid control generates an error steady state response about 3° during hovering and being able to hovering back within 1.5 seconds if the given disctraction is 19° and 1 second if the given distraction of 13° .

Keywords : Quadcopter, Hybrid, PID Control, Fuzzy Logic, Hovering.