DESIGN AND IMPLEMENTATION FUZZY MODEL REFERENCE ADAPTIVE CONTROL (FUZZY-MRAC) METHOD FOR AUTO TAKE-OFF PROCESS ON UNMANNED AERIAL VEHICLE (UAV) QUADCOPTER

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ABSTRACT

Due to the rapid technological developments, there are more researcher doing studies to Unmanned Aerial Vehicle (UAV) especially in quadcopter. This is possible in the information age to design an unmanned flight robust system at the actual capacity with a relatively low cost.

Controller using MRAC (Model Reference Adaptive Control) methods is known as a controller that can made an action to the plant to meet the design specifications according to the desired performance. The nature of the controller forces the plant’s response to resemble the response of the model reference. The Model’s Response can be discrete or continuous time, linear or nonlinear depends on the plant’s ability to adapt. MRAC methods using fuzzy controllers (or called fuzzy-MRAC) is a simple control method because it does not require mathematical manipulation. The basis of the take-off of quadcopter are a process to move to a higher elevation on a vertical trajectory which has an advantage, it does not require some wide movement space.

From the experiment of quadcopter using fuzzy-MRAC method it show responses that look alike the characteristic of model reference response. The controller gives control signal and it got 3 unit of time sampling (0.135ms) delays and error steady state 16cm.

Keywords: Quadcopter, Fuzzy MRAC, Adaptive Control.