

ABSTRACT

UAV QUADCOPTER MODEL WITH PROPORTIONAL DERIVATIVE CONTROLLER

UAV (unmanned aerial vehicle) quadcopter defined as unmanned mini-rotorcraft that capable to controlling the motion dynamics of it to attain particular purpose. Transmitter follower is a navigation method for UAV quadcopter to follow transmitter autonomously. Quaternion is a method to represent the attitude and rotation of a rigid body.

Aerodynamic system of UAV quadcopter cause translational and rotational motion. Translational motion is affected by the attitude of UAV quadcopter, and rotational motion occurs when the rotating propellers created non-uniform thrust force. By analyzing the attitude and the motion dynamics of UAV quadcopter then its mathematical model can be obtained. The mathematical model can be applied in system modeling in the manner of simulation to find out the UAV quadcopter characteristics, modify it, and apply it to the real system.

The complexity of the system, environmental uncertainty, disturbance, and conservation of linear and angular momentum in motion dynamics cause problems when building automatic control system of UAV quadcopter. The proportional and derivative controller will provide proportional control signal and correcting error signal before the error become too large. By building a navigation system based on transmitter follower, modeling the motion mathematically, and applying proportional derivative control system, then UAV quadcopter is expected to be able move autonomously and dynamically.

Keywords; UAV, quadcopter, quadrotor, model, proportional derivative controller; dynamics; simulation; quaternion.