Design, Control and Autonomous Trajectory Tracking of an Octorotor Rotorcraft

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Abstract : Principal aim of this research is trajectory tracking, attitude and position control scheme in real flight mode by an Octorotor helicopter. For more stability, in this Unmanned Aerial Vehicle (UAV), number of motors is increased to eight motors which end of each arm installed two coaxial counter rotating motors. Dynamic model of this Octorotor includes of motion equation for translation and rotation. Utilized controller is proportional-integral-derivative (PID) control loop. The proposed controller is designed such that to be able to attenuate an effect of external wind disturbance and guarantee stability in this condition. The trajectory is determined by a Global Positioning System (GPS). Also an ARM CortexM4 is used as microprocessor. Electronic board of this UAV designed as able to records all of the sensors data, similar to an aircraft black box in external memory. Finally after auto landing of Octorotor, flight data is shown in MATLAB software and Experimental results of the proposed controller show the effectiveness of our approach on the Autonomous Quadrotor in real conditions.

Keywords : octorotor, design, PID controller, autonomous, trajectory tracking

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