FUZZY-PID ALGORITHM CONTROL FOR HELI2DOF

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ABSTRACT

Heli2DOF model is designed in the laboratory for studying of basic problem in the helicopter control. Due to its mechanical structure, the helicopter has itself created the unwanted moments while operating that effect to the flight. The movement in center of gravity will cause disturbance torques in flight, which makes the helicopter dive downward/ upward or negative change in the altitude. This is because the body of the helicopter is similar to a pendulum hanging from the main rotor; any changes of center of gravity (CG) definitely cause changes in this angle and disturbance. This issue should be controlled by the automatic controller in order to reduce the burden on the flight operator. This paper presents the idea of the Algorithms of PID combined with Fuzzy that solve this issue, also it is stability assistance of the system, even there is the disturbance of aircraft gravity. The authors suggest Fuzzy logic controller in order to adjust the PID coefficients for the purpose of its efficiency with the nonlinearity of the system in the Pitch ($\boldsymbol{\theta}$) and Yaw ($\boldsymbol{\psi}$) angle position control. Under the disturbance wind causing the loss of control of aerodynamics force of the propeller, nonlinearity of the system is very high; however, the controller ensures the control of system. This idea has been successfully on this Heli2DOF model.

Keywords: Helicopter 2DOF, nonlinear MIMO system, Automatic Control Helicopter 2DOF, Fuzzy-PID control for Heli2DOF.