ACTIVE MODELING BASED YAW CONTROL OF UNMANNED ROTORCRAFT

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Abstract- With the characteristics of input nonlinearity, time-varying parameters and the couplings between main and tail rotor, it is difficult for the yaw dynamics of Rotorcraft to realize good tracking performance while maintaining stability and robustness simultaneously. In this paper, a new kind of robust controller design strategy based on active modeling technique is proposed to attenuate the uncertainties pre-described in the yaw control of unmanned systems. Firstly, by detailed analysis, the uncertainties are introduced into the new-designed yaw dynamics model by using the concept of modeling errors. Then, Kalman filter is used to estimate the modeling errors simultaneously, which is used subsequently to design the robust controller. Finally, the new strategy is tested with respect to the unmanned Rotorcraft system to show the feasibility and validity of it.

Index terms*:* Unmanned Rotorcraft, Active modeling technique, Model error, Kalman filter (KF).