FUZZY LOGIC CONTROL OF THE HIGHT OF THE AIRPLAINE

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Abstract: Fuzzy logic controllers are useful in many industrial linear and non linear systems. Nowadays, the fuzzy logic controllers (FLC) replace the classic methods of PID control. The main difficulties with the FLC are the need of a great practical experience and expert knowledge in order to design them. This publication presents one application of the FLC where the FLC are used to control the height of the Aerosonde UAV (Unmanned Aerial Vehicle – UAV) model of an airplane.

All tests of the FLCs are made on a 6 DOF Aerosonde UAV simulation model of an airplane. The UAV is an autonomous airplane that is made to use it under different weather conditions and with the possibility to control it remotely. The speed control, the elevator control and the attack angle are regulated with three additional FLCs.

The unbalanced roll moment caused by the throttle of the airplane, causes a constant roll angle that must be stabilized. For normal function of the airplane, the roll, yaw and pitch angle. In Mathlab, the stability of the Aerosonde UAV is established with three different conventional PI, PD and / or PID controllers. In this application, the stability of the Aerosonde UAV is established with three different FLCs. They regulate the roll angle, the attack angle and the speed of the airplane. The height of the airplane is controlled with a fourth FLC and that was the goal of this publication.

The FLC responsible for the height control receives the current height of the airplane and the desired value of the height of the airplane as input signals. There are altogether 11 rules that create the output of the FLC. The output of the FLC is the requested elevator angle that is needed so that the airplane flies at the requested height. The membership functions that are used are simple triangle functions.

This publication presents one use of the fuzzy logic controllers which successfully replace the conventional PID controllers.

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