

Abstract

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Dynamic Modeling, Fuzzy control and Stabilization of Quadrotor Vehicle

Unmanned aerial vehicles (UAVs) had taken an important role in the scientific study encouraged by the military, civilian, and space applications. As they introduce a replacement of the human piloted vehicles they are advantageous to protect human life in multiple dangerous environments. Their reliabilities in tough circumstances are much higher than their counter parts. This book focuses on quadrotor modelling to be used as a tool for the studying the control system. The non-linear mathematical model shown takes into considerations the air frictional dynamics for a quadrotor vehicle. The model is coded into a Matlab/Simulink model and a PID controller is applied on the model in addition to an Artificial Intelligent (AI) designed using the fuzzy logic algorithms. Stability analysis of fuzzy systems is a problem faced in a wide variety of applications. This book presents a practical approach to stabilize fuzzy controller used to control quad rotor vehicle based on adaptive nonlinear feedback. This is done using a fuzzy stabilizer in the feedback path of the control loop.