عنوان مقاله:

Attitude Tracking Control of Autonomous Helicopter using Polytopic-LPV Modeling and PCA-Parameter Set Mapping

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خلاصه مقاله:

This paper presents a new method for modeling and Attitude Control of Autonomous Helicopters (A.H.) based on a polytopic linear parameter varying approach using parameter set mapping with the Principal Component Analysis (PCA). The polytopic LPV model is extracted based on angular velocities and Euler angles, that is influenced by flopping angles, by generating a set of data over the different trim points. Because of the high volume of trim data, parameter set mapping based on (PCA) is used to reduce the parameter set dimension. State feedback control law is proposed to stabilize the system by introducing a Linear Matrix Inequality (LMI) set over the vertices models. The proposed controller is performed for an Autonomous Helicopter in different scenarios. All the scenarios are investigated with the PCA algorithm as a technique for reducing the computational volume and increasing the speed of solving the LMI set. The simulation results of implementing the planned controller on the nonlinear model of an autonomous helicopter in different scenarios show the effectiveness of the proposed scheme.

کلمات کلیدی:

Attitude Control, Linear Matrix Inequality, Linear Parameter Varying, principal component analysis

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