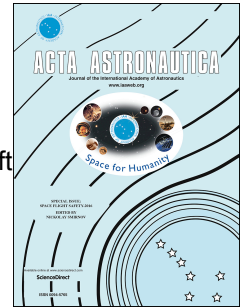


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Multi-objective integrated robust H_∞ control for attitude tracking of a flexible spacecraft

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Abstract: This paper investigates the multi-objective attitude tracking problem of a flexible spacecraft in the presence of disturbances, parameter uncertainties and imprecise collocation of sensors and actuators. An integrated robust H_∞ controller, including an output feedback component and a feedforward component, is proposed, and its gains are calculated by solving Linear Matrix Inequalities. The output feedback component stabilizes the integrated control system while the feedforward component can drive the attitude motion to track the desired angles. The system robustness against disturbances, parameter uncertainties and imprecise collocation is addressed by the H_∞ approach and convex optimization. Numerical simulations are finally provided to assess the performance of the proposed controller.

Keywords: Attitude control, Flexible spacecraft, Robust control, Output feedback, Multi-objective

1. Introduction

Attitude control is a key requirement for most space missions, and many different approaches to addressing this problem are proposed [1-5]. The problem of spacecraft attitude control can be generally classified in two separate

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