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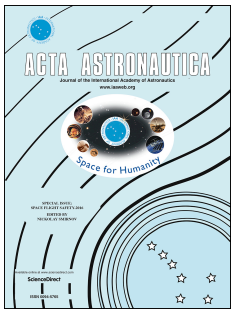

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Sensor Fault Detection and Recovery in Satellite Attitude Control

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Abstract

This paper proposes an integrated sensor fault detection and recovery for the satellite attitude control system. By introducing a nonlinear observer, the healthy sensor measurements are provided. Considering attitude dynamics and kinematic, a novel observer is developed to detect the fault in angular rate as well as attitude sensors individually or simultaneously. There is no limit on type and configuration of attitude sensors. By designing a state feedback based control signal and Lyapunov stability criterion, the uniformly ultimately boundedness of tracking errors in the presence of sensor faults is guaranteed. Finally, simulation results are presented to illustrate the performance of the integrated scheme.

Keywords: Sensor Fault Detection and Recovery, Satellite Attitude Control, State Feedback Control, Lyapunov Stability

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