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短文

一类挠性航天器大角度快速机动的模型跟踪控制

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摘要
研究一类构形为中心刚体带挠性梁的航天器的平面大角度快速机动控制问题. 推导了系统的非线性无穷维模型, 设计了一种只利用中心刚体旋转角和角速度测量数据的模型跟踪控制方案, 基于无穷维空间的LaSalle不变原理, 证明了相应闭环系统的渐近稳定性, 并给出了物理实验结果验证所设计的控制算法的有效性.

关键词 挠性航天器 大角度机动 模型跟踪控制

分类号

Model Following Control for Large Angle Rapid Maneuvering of a Flexible Spacecraft

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Abstract
This paper is concerned with the control for planar, large angle rapid slew maneuvering of a flexible spacecraft ,consisting of a rigid central body and a flexible beam. A nonlinear infinite dimensional model of the system is derived. By using the measurements of the attitude angle of the rigid central body and its velocity only ,a kind of model following control law is presented. Based upon the LaSalle's invariance principle in infinite dimensional spaces, it is shown that implementation of the control algorithm results in asymptotic stability of the closed-loop system. Some experimental results are presented, showing the effectness of the designed control algorithm.

Key words Flexible spacecraft large angle rapid maneuvering model following control

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