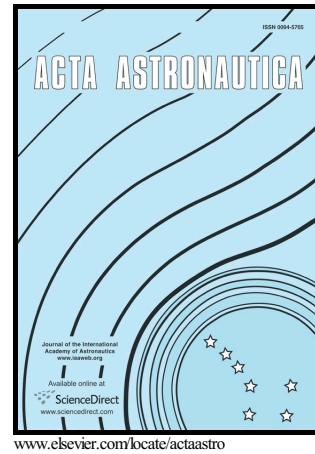


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Dynamic characteristics of vibration isolation platforms considering the joints of the
struts

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Abstract

This paper discusses the dynamic characteristics of the impacts and corresponding frictions generated by the clearances of joints of vibration isolation platforms for control moment gyroscopes (CMGs) on spacecraft. A contact force model is applied using a nonlinear contact force model, and the frictions in the joints are considered in the dynamic analysis. First, the dynamic characteristics of a single isolation strut with spherical joints were studied, and joints with different initial clearance sizes were separately analyzed. Then, dynamic models of the vibration isolation platform for a CMG cluster with both perfect joints and joints with clearances were established. During the numeral simulation, joints with different elastic moduli were used to study the nonlinear characteristics. Finally, the distributions of the collision points, which can serve as a reference for the reliability and lifetime of a platform, were given.

Key words: clearance of joints, vibration isolation struts, Stewart platform

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