

MATERIALS AND STRUCTURES SYMPOSIUM (C2)
Space Structures - Dynamics and Microdynamics (3)

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TOPOLOGICAL AND DEPLOYMENT ANALYSIS OF TETRAHEDRON UNIT DEPLOYABLE
ANTENNA

Abstract

Large deployable antennas have extensive applications in communication satellites and space stations. Usually, a deployable structure is composed of many modules. It has merits of simple mechanism, high deployment efficiency, low designing and manufacturing cost etc. This paper discusses a kind of tetrahedron unit deployable antenna driven to deploy by torsional springs, of which the form is very simple. Topological design concepts on this kind of structure are presented, and a deployable antenna with high surface precision can be fabricated by these theories. Using dynamic theory, considering relative constraints, equations are established to analyze the deployment process of the structure. Also a program based on VC++ is developed, using the program we analyze and simulate the deployment process of this kind of structure. The velocities and accelerations of all joints in an antenna can be obtained during deployment. We conclude that the deployment of this kind of structure is synchronous.