Synchronization of Dumbbell Satellites: Generalized Hamiltonian Systems Approach

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Abstract: In this paper, the attitude synchronization problem of two dumbbell satellite models is addressed. To achieve this purpose, a synchronization approach based on generalized Hamiltonian systems and state observer design reported in literature, is applied. Potential applications of attitude synchronization are multi-satellites arrays for self assembly structures, and resolution enhancement. Numerical results of the synchronization behavior achievement are presented.

Keywords: *dumbbell satellites; attitude synchronization; generalized Hamiltonian systems; nonlinear observers.*

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1 Introduction

Modern space missions involve the use of multiple small satellites, this scheme introduces several advantages compared to single satellite missions. An interesting topic regarding these missions, is the attitude synchronization of the satellites. This allows to handle larger structures than what can be launched. Some interesting applications include: resolution enhancement, interferometry or, super-sized focal length [1], this behavior is also useful for in-orbit-self-assembly operations [2].

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