Virtual Spring-Damper Modeling of Spacecraft Formation Flight Methods

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Abstract

This presentation derives spring-damper modeling of distance-based spacecraft formation control methods. Nowadays, small satellites with various structures, as complements to the limitation of a large monolithic satellite, are presenting a booming trend. For the maximum application of small satellites, various formation control methodologies were introduced such as tether-based method, electromagnetic method, and Coulomb force method. Also, convergence analysis was performed with virtual spring-damper mesh and energy analysis method. Such analysis showed the possibility of active shape control for the spacecraft formation using propellant-less internal forces. As a further work for the spring-damper analysis, actual translation of various formation control methods into the spring-damper system will be proposed.

Keywords: *formation shape control, spacecraft formation flying, spacecraft guidance and control, spring-damper mesh*

References

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