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ATTITUDE CONSENSUS CONTROL OF SPACECRAFT FORMATION FLYING: MODEL-BASED DESIGN

**Abstract**

Spacecraft Formation Flying (SFF) is a key technology enabler for number of Space Exploration (SE) and Earth Observation (EO) missions. For example, New World Mission is proposing two spacecraft fly in formation, the star shade to block the light of nearby star (such as alpha Centauri) allowing the other spacecraft, telescope, to detect exoplanets orbiting the targeted star. This required orbit (translation) control as well as attitude control of the formation. This paper proposed a simple model-based design for attitude consensus control as a part of an SFF. The motivation behind it is to give the researcher more focus on designing the attitude consensus control law and outsourcing the spacecraft dynamics modeling. A model-based decentralized schematic spacecraft dynamic is proposed, then three attitude formation control laws are implemented: 1) attitude consensus control law with zero final angular velocities, 2) with no-zero final angular velocities and 3) finite-time attitude synchronization control. All the three control laws are proposed, proofed, and published previously. Finally, the results are compared with authors' results associated with aforementioned control laws. A simulation model including 3D visualization is presented. In the future work, orbit control dynamics will be implemented.