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Late breaking abstracts (LBA)

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A MULTISENSOR DATA FUSION APPROACH FOR SPACECRAFT CONTROL EXPERIMENTS WITH THE KNATTE PLATFORM

Abstract

The Kinesthetic Node and Autonomous Table-Top Emulator (KNATTE) is a three-degree-of-freedom frictionless vehicle that serves as a multipurpose platform for real-time spacecraft hardware-in-the-loop experiments. The data acquisition of the vehicle depends on a Computer Vision System (CVS) that yields position and attitude data, but also suffers from unpredictable blackout events. To complement such measurements, KNATTE incorporates an Inertial Measurement Unit (IMU) that yields accelerometer, gyroscope, and magnetometer data. This study describes a multisensor data fusion approach to obtain accurate attitude information by combining the measurements from the CVS and the IMU using nonlinear Kalman filter algorithms. To do this, we develop the data fusion algorithms and test them in a MATLAB/Simulink environment. After that, we adapt the algorithms to the KNATTE platform and confirm the performance in various conditions. Through this work, we can check the accuracy and efficiency of the approach by numerical simulation and real-time experiments.