CubeSat Attitude Estimation via AUKF using Magnetometer measurements and MRPs

In this article the Attitude and Control system of a CubeSat is presented. The attitude estimation design approach used is based on Adaptative Unscented Kalman Filter (AUKF) using three-axis magnetometer measurements. A set of modified Rodrigues Parameters (MRPs) is used to evaluate the attitude. Finally in order to have an complete ADCS system two control laws are introduced (Bdot and Sliding Mode) to best simulate a real CubeSat mission. The first one allows the spacecraft the control during the detumbling phase (phase at high angular rates) and in case of reaction wheels saturation and the second one is used for the nominal control (phase at low angular rates).