

Satellite attitude performance during the momentum dumping mode.

ABSTRACT

In this paper, the active magnetic control technique is applied for controlling the attitude and nutation of roll/yaw axes as well as unloading the excess wheel angular momentum for a small biased-momentum satellite in a nominal operation. Two control structures are configured using 2 and 3 magnetic torquers. The proportional controller is used for the attitude and nutation control of roll/yaw axes while the proportional-integral controller is used for the wheel momentum unloading task. Both systems are evaluated through numerical treatments and compared particularly during the momentum unloading process. The performance from simulations exhibits that both systems fulfill the mission requirements. However, the system that uses 3 magnetic torquers gives a better attitude performance.

Keyword: Magnetic control; Momentum biased; Momentum unloading.