

Deterministic and Recursive Approach in Attitude Determination for InnoSAT.

ABSTRACT

Attitude determination system (ADS) was indispensable in attitude control of satellite. Especially for InnoSAT due to the limitation of budget, weight, and power, the attitude was determined using onboard position sensors. Previous research has successfully implemented the attitude determination using only Earth's magnetic field sensors for small attitude angle, but the approach produced quite big error for large attitude angle. This paper presents attitude determination for InnoSAT using combination of sun sensors and earth's magnetic field for large attitude angle. The attitude was determined using a deterministic (QUEST) and recursive (EKF) approach. A problem arises when using the sun sensors while the satellite experiencing eclipse. Consequently, the accuracy of both approaches was analyzed at eclipse and no eclipse conditions. The result shows that deterministic approach produced better accuracy at no eclipse but recursive approach produced better accuracy at eclipse. The strategy to apply the both approaches and eclipse conditions also discussed in this paper.

Keyword: Attitude determination, InnoSAT, EKF, QUEST