

Spacecraft Combined Attitude and Sun Tracking (CAST) System.

Abstract

The spacecraft solar panel Sun tracking mechanism is utilized as an attitude control system. This is done by manipulating the tracking control of both the solar panels along the spacecraft pitch axis to generate torque in order to counter-act the external disturbance along this axis. The two solar panels are rotated at different speeds in order to generate the required torque. Matlab™ Simulink® was used to evaluate the system where the inputs are Sun tracking function and attitude reference while the outputs are the solar panel rotation angle due to Sun tracking and spacecraft's pitch attitude. The governing equations together with the onboard attitude and solar tracking architecture are established. The architecture is numerically tested. The simulation results are discussed especially from the attitude control standpoint. The integrated system complies very well with the reference mission requirement.

Keyword: PD control; Attitude control; CAST; Solar tracking.