Two degree-of-freedom spacecraft attitude controller

ABSTRACT

Two degree-of-freedom controller is designed together with its governing equations for a spacecraft pitch attitude control. The attitude controller incorporates the Active Force Control (AFC) technique into the conventional Proportional-Derivative (PD) controller based spacecraft pitch attitude loop. The PD-AFC attitude controller is then employed to enhance the attitude pointing of the Combined Energy and Attitude Control System (CEACS). Numerical treatments are performed to validate the effectiveness of AFC, whereby the CEACS attitude performance is analysed from its accuracy point of view. The results show that the PD-AFC attitude control performance is superiorly better than that of the solely conventional PD type.

Keyword: Spacecraft attitude control; PD controller; AFC technique