



REFERENCE MODEL VARIABLE STRUCTURE OUTPUT FEEDBACK FOR ATTITUDE MANEUVERS CONTROL OF FLEXIBLE SPACECRAFTS

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ABSTRACT—In this paper, a new and simple approach for the vibration control of flexible spacecrafts during the attitude maneuvering is proposed. Our control strategy integrates the command input shaping and Reference Model Variable Structure Output Feedback Control (RMVSOFC) techniques. In this method, the input shaper is implemented outside of the feedback loop to achieve the exact elimination of the residual vibration of the reference model. For the feedback loop, a controller is designed to make the closed-loop system follow the reference model at the presence of lumped perturbation. An attractive feature of the proposed RMVSOFC algorithm is the lumped perturbation does not have to satisfy the so-called matching, provided that certain bounds are known beforehand. Computer simulation results are given to demonstrate the effectiveness of this new vibration control technique.

Key Words: Vibration suppression, Input shaping, Flexible spacecrafts, Sliding mode control, Attitude maneuver