

عنوان مقاله:

Constraint Control Allocation Using Differential Evolution for Overactuated Geostationary Communications Satellite

محل انتشار:

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خلاصه مقاله:

In this work we consider a new technique for the control allocation problem for an over-actuated GEO Communications satellite. Control allocator system computes the required commands that should be applied to the optimum distributed thrusters on the outer surface of the satellite so that a certain set of torques would be generated using this actuators. The number of actuators is greater than the number of torque necessary to be compensated, and the controlling ranges of the actuators are constrained to the certain pre-specified linear active domains. Control allocation problem is formulated as an optimization problem so that all of the available degrees of freedom can be utilized. When sufficient control power exists, secondary performance objectives could be achieved. The proposed methodology enables reconfiguration control in the presence of actuator failures, while the controller keeps being unchanged. The differential evolution optimization method is used to allocate control commands. The performance and accuracy of the proposed method have been verified using pseudo-inverse and linear programming methods. The case study results applied to a typical GEO satellite control subsystem design, demonstrates the effectiveness of the differential evolution method in comparison with the other algorithms.

کلمات کلیدی:

Control Allocation, Satellite Attitude Control, Control Constraints, Actuator Failure

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