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SPACE SYSTEMS SYMPOSIUM (D1)
Innovative and Visionary Space Systems Concepts (1)

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ADAPTATION OF THE CACM-RL ALGORITHM TO THE ATTITUDE CONTROL SYSTEM OF A SATELLITE

Abstract

In this paper we propose the application of an optimal control algorithm developed for non-linear systems to the attitude control of a satellite. This new algorithm combines reinforcement learning and cell mapping techniques, extrapolating the local knowledge to the rest of the discretized state space. It does not need any mathematical model of the satellite, giving as a result the optimal planification of the trajectory, which means optimal pointing in the case of a satellite. This method has been previously applied to a 4 wheels robot, being the system nonlinear and non holonomic, and the approach followed is to apply it to the attitude control system of a satellite. Our simulations are based on the modified and extended algorithm by using Matlab Simulink as the simulation environment. Our results show that the method can cope with the dynamics of a satellite achieving precisely the objective of a determinate established attitude and able to maintain it.