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DRON SIMULATION FOR THE CONTROL OF A SATELLITE TRAJECTORY WITH FIXED ATTITUDE

Abstract

This work focuses on the modelling, control, optimization and actual flight of a quadrotor helicopter to emulate the control of a satellite working under a given fix attitude while in orbit.

The modelling uses the unit Quaternion to represent attitude and the control study the performance in presence of parametric uncertainty considering optimal energy consumption for two different controllers: the first strategy is the LQR Control that uses Bryson's rule as algorithm for determining the weight matrices, while the second strategy is the exact linearization of the model working together with dynamic feedback.

Results show that the first controller present a steady state error quite large on trajectory tracking, whereby second process decreases the phase error while remaining within the optimal energy consumption.

Finally, a human computer interface is developed to introduce the proper satellite parameters and make them similar to the actual quadrotors.