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Nonlinear Model Predictive Control of Quadcopter

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Abstract : In this paper, a quadcopter is controlled by a nonlinear model predictive controller, NMPC, for trajectory tracking in presence of an external perturbation. The nonlinear model predictive control was basically confined to slow processes. Applications to fast processes such as robots are rare because the time for the solution may exceed the sampling period. Metaheuristics have been used for solving many difficult problems. In this work, we consider the application of the Particle Swarm Optimization algorithm to the NMPC optimisation problem model applied for the quadcopter tracking trajectory with presence of an external perturbation. Results show that NMPC-PSO provides a fast solution and can be used in real time.

Keywords : quadcopter, nonlinear model predictive control, Particle Swarm Optimization, tracking trajectory