Trajectory tracking and obstacle avoidance for cable driven robot by Nonlinear Model Predictive Control

Halim MERABTI, Bilel Bouchemal, Kamel Boucherma, Khaled Belarbi

Abstract : In this paper, nonlinear model predictive control is proposed to solve the tracking trajectory and obstacle avoidance of the cable based robot. The application of the nonlinear model predictive control scheme in the field of robotics was limited by the computational burden associated with optimization algorithms to be solved at each sampling. The Particle Swarm Optimization algorithm is used for the solution of the optimization problem arising in the nonlinear MBPC applied for the cable robot tracking trajectory with fixe obstacle avoidance. Quality of the solution and computation time shows that NMPC-PSO can be an alternative for real time applications.

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