

MULTI-OBJECTIVE PREDICTIVE CONTROL: A SOLUTION USING METAHEURISTICS

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Abstract: The application of multi objective model predictive control approaches is significantly limited with computation time associated with optimization algorithms. Metaheuristics are general purpose heuristics that have been successfully used in solving difficult optimization problems in a reasonable computation time. In this work , we use and compare two multi objective metaheuristics, Multi-Objective Particle swarm Optimization, MOPSO, and Multi-Objective Gravitational Search Algorithm, MOGSA, to generate a set of approximately Pareto-optimal solutions in a single run. Two examples are studied, a nonlinear system consisting of two mobile robots tracking trajectories and avoiding obstacles and a linear multi variable system. The computation times and the quality of the solution in terms of the smoothness of the control signals and precision of tracking show that MOPSO can be an alternative for real time applications.

Keywords : Model predictive control, Metaheuristicis, Multiobjective Optimization