

Abstract

Mostafa Ahmed Abdel Galil

Adaptive PID controller based on model predictive control

Model Predictive Control (MPC) is very suitable controller for many industrial applications especially for constrained systems. However, it requires high computation burden. On the other side, PID controller is simple and popular for industrial applications in particular for Single Input Single Output (SISO) systems but it is difficult to be tuned especially for constrained systems. To gain the benefits of the two controllers and reduce their limitations, a hierarchical control structure (two levels) is proposed. The algorithm concept focuses on the adaptation of PID controller parameters (lower level) according to the MPC performance (higher level). The algorithm is tested on two constrained systems separately excited DC motor as a SISO system and three tank system as Multi Input Multi Output (MIMO) benchmark system.