

Abstract

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Application of model predictive control for fault tolerant system using dynamic safety margin

Model predictive control (MPC) has the ability to cope with hard constraints on control and state. It has, therefore, been widely applied in most industries specially, petrochemical industries. Dynamic safety margin (DSM) is a performance index used to measure the distance between a predefined safety boundary, described by a set of inequality constraints, in state space and system trajectory as it evolves. Designing MPC based on DSM is especially important for safety critical system to maintain a predefined margin of safety during transient and steady state. In this work, MPC based on DSM is used in fault tolerant control (FTC) design. The proposed method of FTC is suitable for single and multi-model system according to the fault type and fault information. It can compensate missed information about the fault and uncertainties in the faulty model