

Stability of Stochastic Model Predictive Control for Schrödinger Equation with Finite Approximation

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Abstract : Recent technological advance has prompted significant interest in developing the control theory of quantum systems. Following the increasing interest in the control of quantum dynamics, this paper examines the control problem of Schrödinger equation because quantum dynamics is basically governed by Schrödinger equation. From the practical point of view, stochastic disturbances cannot be avoided in the implementation of control method for quantum systems. Thus, we consider here the robust stabilization problem of Schrödinger equation against stochastic disturbances. In this paper, we adopt model predictive control method in which control performance over a finite future is optimized with a performance index that has a moving initial and terminal time. The objective of this study is to derive the stability criterion for model predictive control of Schrödinger equation under stochastic disturbances.

Keywords : optimal control, stochastic systems, quantum systems, stabilization

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