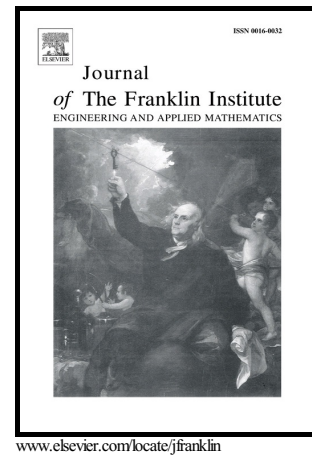


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Controller Design for Nonlinear and Non-Gaussian Multivariable Systems Based on Survival Information Potential Criterion

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Abstract

In this paper, a new model-free control strategy for general nonlinear and non-Gaussian multivariable stochastic systems has been proposed. The strategy applies minimum survival information potential control (MSIPC) scheme to decrease the closed-loop randomness of the output in the information theory framework. Compared with traditional entropy measures, survival information potential (SIP) has many advantages, such as validity in a wide range of distributions, robustness, the simplicity in computation, and so on. In order to calculate the SIP, the empirical SIP formulation under scalar data case is derived directly based on ordered error sample data. By minimizing the performance index mainly consists of SIP, a new model-free control algorithm is obtained for the considered multivariable nonlinear and non-Gaussian stochastic systems. The analysis on the proposed MSIPC convergence is made and a numerical example is provided to show the effectiveness of the obtained control algorithm, where encouraging results have been obtained.

Keywords: Non-Gaussian stochastic system; survival information potential; model-free control strategy; optimization

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