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Stochastic Model Predictive Control for Linear Discrete-Time Systems with Random Dither Quantization

Authors : Tomoaki Hashimoto

Abstract : Recently, feedback control systems using random dither quantizers have been proposed for linear discrete-time systems. However, the constraints imposed on state and control variables have not yet been taken into account for the design of feedback control systems with random dither quantization. Model predictive control is a kind of optimal feedback control in which control performance over a finite future is optimized with a performance index that has a moving initial and terminal time. An important advantage of model predictive control is its ability to handle constraints imposed on state and control variables. Based on the model predictive control approach, the objective of this paper is to present a control method that satisfies probabilistic state constraints for linear discrete-time feedback control systems with random dither quantization. In other words, this paper provides a method for solving the optimal control problems subject to probabilistic state constraints for linear discrete-time feedback control systems with random dither quantization.

Keywords : optimal control, stochastic systems, random dither, quantization
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