

Numerical Simulations on Feasibility of Stochastic Model Predictive Control for Linear Discrete-Time Systems with Random Dither Quantization

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Abstract : The random dither quantization method enables us to achieve much better performance than the simple uniform quantization method for the design of quantized control systems. Motivated by this fact, the stochastic model predictive control method in which a performance index is minimized subject to probabilistic constraints imposed on the state variables of systems has been proposed for linear feedback control systems with random dither quantization. In other words, a method for solving optimal control problems subject to probabilistic state constraints for linear discrete-time control systems with random dither quantization has been already established. To our best knowledge, however, the feasibility of such a kind of optimal control problems has not yet been studied. Our objective in this paper is to investigate the feasibility of stochastic model predictive control problems for linear discrete-time control systems with random dither quantization. To this end, we provide the results of numerical simulations that verify the feasibility of stochastic model predictive control problems for linear discrete-time control systems with random dither quantization.

Keywords : model predictive control, stochastic systems, probabilistic constraints, random dither quantization

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