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OPTIMAL GUARANTEED COST CONTROL OF STOCHASTIC DISCRETE-TIME SYSTEMS UNDER MARKOVIAN REGIME SWITCHING

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Abstract. A problem of robust guaranteed cost control of stochastic discrete-time systems with parametric uncertainties under Markovian switching is considered. The jump Markovian switching is modelled by a discrete-time Markov chain and the noise or stochastic environmental disturbance is modelled by a sequence of identically independently normally distributed random variables. Using linear matrix inequalities (LMI's) approach, the robust quadratic stochastic stability is obtained. The proposed control law for this quadratic stochastic stabilization result depended on the mode of the system. This control law is developed such that the closed-loop system with a cost function has an upper bound under all admissible parameter uncertainties. The upper bound for the cost function is obtained as a minimization problem. Two numerical examples are given to demonstrate the potential of the proposed techniques and obtained results.

Keywords. Stochastic Stability, Markovian Jump Linear Systems, guaranteed cost, quadratic stabilization, discrete-time stochastic systems.

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