DUALITY: DETECTABILITY VERSUS STABILIZABILITY IN THE STOCHASTIC CONTEXT[*]

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Abstract

The aim of this paper is to extend to the stochastic framework the well known duality relation between the detectability property and the stabilizability property of a finite dimensional, linear time invariant, deterministic system. We consider continuous time linear stochastic systems having the state space representation described by a system of Itô differential equations with periodic coefficients possibly subject to some stochastic perturbations modeled by a standard homogeneous Markov process with a finite number of states. It will be seen that in the case when the given system is affected by jump Markov perturbations a state space representation of the dual triple may be rigorously defined if and only if the transition probability matrix of the Markov process is double stochastic (in the sense that the sums of all elements from its each row and each column are equal 1).

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