MEAN SQUARE ASYMPTOTIC STABILITY OF DISCRETE-TIME LINEAR FRACTIONAL ORDER SYSTEMS*

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Dedicated to Dr. Vasile Drăgan on the occasion of his 70th anniversary

Abstract

This paper considers stability problems for discrete-time linear fractional -order systems (LFOSs) with Markovian jumps and/ or multiplicative noise. For the case of LFOSs with finite delays and Markovian jumps, we provide sufficient conditions for the mean-square asymptotic (MSA) stability or instability of the system by using Lyapunov type equations. In the absence of the Markovian perturbations, we use Z-transform and operator spectral properties to derive instability criteria for fractional-order systems with multiplicative random perturbations and either finite or infinite delays. Four numerical results accompanied by computer simulations illustrate the effectiveness of the theoretical results.
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