
GIQ **29** (2024) 59–74

SERIES ON
Geometry, Integrability
and Quantization
ISSN 1314-3247

GENERALISED DISCRETE-TIME RICCATI EQUATIONS OF OPTIMAL CONTROL FOR LINEAR SYSTEMS WITH MARKOVIAN JUMPS IN BOREL SPACES

VIORICA MARIELA UNGUREANU

Communicated by Vladimir I. Pulov

This paper addresses the problem of the existence of global minimal solutions for a class of general Riccati equations (REs) arising in linear quadratic (LQ) optimal control problems for infinite-dimensional linear systems (LSs) with uncountable Markovian jumps (MJs). We establish sufficient conditions for the existence of these solutions in the cases where the REs are defined on ordered spaces of operator-valued measurable functions. This work extends previous results concerning the existence of minimal solutions for REs defined on Banach spaces of sequences of linear operators. Our results can be used to design optimal controls that minimize infinite-horizon quadratic cost functionals associated with infinite-dimensional LSs with control and MJs.

MSC: 39A05, 39A50, 47A56, 47A63, 60J76
Keywords: Discrete-time systems, Markov chains with Borel state space, optimal control, Riccati equations

Contents

doi: 10.7546/giq-29-2024-59-74