Zhou, Min; Xiang, Huili

Feedback controls for desired dynamical behaviours of a new stochastic ecosystem with regime switching. (English) Zbl 1480.92236

Summary: This paper is concerned with the feedback control problems of a new stochastic ecosystem with regime switching expressed by a partially observable Markov chain. The main idea is to convert the partially observable system into a complete observable one by estimating the unobservable Markov chain by Wonham filter. For the complete observable system, the authors discuss the existence, uniqueness, stochastic boundedness and sample path continuity of the positive solution by constructing Lyapunov functions, and design various forms of feedback controls to regulate the long-time dynamic behaviours of the system. The idea and methods in this paper can also be applied to other partially observable control systems such as financial systems, infections disease system and so on.

MSC:
92D40 Ecology
93E03 Stochastic systems in control theory (general)
93B52 Feedback control

Keywords:
- dynamical behaviours
- feedback controls
- stochastic ecosystem
- partial observation

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References:


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