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Stability analysis of impulsive stochastic delayed Cohen-Grossberg neural networks driven by Lévy noise. (English) Zbl 07576351

Summary: This note investigates the stabilities for impulsive stochastic delayed Cohen-Grossberg neural networks driven by Lévy noise (ISDCGNNs-LN), including the input-to-state stability (ISS), integral input-to-state stability (iISS) and $\phi_\theta(t)$-weight input-to-state stability ($\phi_\theta(t)$-weight ISS, $\theta > 0$). Utilizing the multiple Lyapunov-Krasovskii (L-K) functions, principle of comparison, constant variation method and average impulsive interval (AII) method, adequate ISS-type stability conditions of the ISDCGNNs-LN under stable impulse and unstable impulse are obtained. This shows that the stochastic systems are ISS in regard to a lower bound of the AII, provided that the continuous stochastic systems is ISS but has destabilizing impulse. Furthermore, the impulse can effectively stabilize the stochastic systems for a upper bound of the AII, provided that the continuous stochastic systems is not ISS. In addition, our results can also deal with the case of variable time delay. In the end, two examples are presented to reflect the rationality and correctness for the theoretical conclusions.

MSC:
93Cxx Model systems in control theory
93Dxx Stability of control systems
34Kxx Functional-differential equations (including equations with delayed, advanced or state-dependent argument)

Keywords:
input-to-state stability; Lévy noise; average impulsive interval; time delay; Cohen-Grossberg neural networks

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References:

[14] Li, X.; Li, Peng., Stability of time-delay systems with impulsive control involving stabilizing delays, Automatica, 124, 109336 (2021) · Zbl 1461.93436


[26] Xiang, W.; Xiao, J., Stabilization of switched continuous-time systems with all modes unstable via dwell time switching, Automatica, 50, 3, 940-945 (2014) · Zbl 1288.93098


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