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Numerical analysis of epidemic model using artificial neural networks

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This study presents and analyzes a stochastic Lévy jump model with a saturated incidence rate within a stochastic SIR framework. First, we establish that the model has a globally positive solution. Furthermore, we derive a stochastic threshold condition that fully determines the extinction as well as the persistence of epidemics, utilizing the semimartingale convergence theorem. Additionally, we present numerical performance results for the proposed model using the Bayesian regularization method in combination with artificial neural network technology. This research lays a strong theoretical basis for understanding epidemic spread, designing effective control strategies, and addressing practical challenges across academic fields.

References

[1] A. Asghar, R. Ikram, A. Khan, M. Hassan, A. A. Raezah, Applications of artificial neural network to solve the nonlinear Cassava mosaic disease model, *The European Physical Journal Plus*, 139:1012, 2024.