Solari, H. G.; **Natiello, M. A.**

Poisson approximation to density dependent stochastic processes. A numerical implementation and test. (English) Zbl 1318.60084

Khrennikov, Andrei (ed.), Proceedings of the workshop 'Dynamical systems from number theory to probability – 2', Växjö, Sweden, December 6, 2002. Växjö: Växjö University Press (ISBN 978-91-7636-386-7/pbk). Mathematical Modelling in Physics, Engineering and Cognitive Sciences 6, 79-93 (2003).

Summary: We implement the recently introduced Poisson approximation on a density dependent jump process corresponding to a simple, but not exactly solvable, epidemiological model. Statistics produced with 106 independent realizations of the Feller process are compared with equivalent statistics produced with Poisson, proper Gaussian and diffusion realizations. While in the Poisson approximation the statistical deviation can be reduced to a satisfactory level by reducing the time step of the simulation, and the Gauss approximation will only be rejected in the most demanding situations, the statistical deviation of the diffusion approximation can easily be perceived in a city with mean population of $\sim 10^4$ individuals. This deviation cannot be reduced decreasing the time step of the simulation.

For the entire collection see [Zbl 1279.00049].

MSC:

60J75 Jump processes (MSC2010)