Qeios

Peer Review

Review of: "Poisson Network SIR Epidemic Model"

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Poisson Network SIR Epidemic Model

In this work, the authors extend the *SIR* model to a *network-based framework* by adding the mean node degree parameter. Through the model, they analyze some epidemic data from the Ebola outbreak by using the Hamiltonian Monte Carlo method. They claim that the network-based models can more effectively capture the heterogeneity dynamics compared to traditional models.

The following points need to be answered:

- Page 2, the authors claim that if $R_0 \leq 1$, the number of infected individuals will decline and the epidemic will not spread. How does the result hold for $R_0 = 1$?
- Page 2, as *I, S* and *R* represent the population, then S+I+R must be an integer. As $S+I+R=1+d$ with $0<d<<1$. The value of *d* shows that $S+I+R=1+d$ is incorrect. Initial conditions for simulations are incorrect.
- Page 2, in the last equation, *R* can be negative. Similarly, *R* is incorrect in system (5).
- Proof of *Theorem 1* is missing.
- Page 10, $P(T_1>t)=S(t)$ is not clear as probability can't be equal to a population.
- Page 10, expression (11) looks incorrect as density is probability, so it can't be negative.
- Page 11, it is not clear how T^*_I and $T_R - T^*_I$ are independent?
- The comparison table is not given to check the efficiency of their model with traditional models.
- There are some typing mistakes.

Declarations

Potential competing interests: No potential competing interests to declare.

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