



Variability of Contact Process in Complex Networks

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We study numerically how the structures of distinct networks influence the epidemic dynamics in contact process. We first find that the variability difference between homogeneous and heterogeneous networks is very narrow, although the heterogeneous structures can induce the lighter prevalence. Contrary to non-community networks, strong community structures can cause the secondary outbreak of prevalence and two peaks of variability appeared. Especially in the local community, the extraordinarily large variability in early stage of the outbreak makes the prediction of epidemic spreading hard. Importantly, the bridgeness plays a significant role in the predictability, meaning the further distance of the initial seed to the bridgeness, the less accurate the predictability is. Also, we investigate the effect of different disease reaction mechanisms on variability, and find that the different reaction mechanisms will result in the distinct variabilities at the end of epidemic spreading.

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