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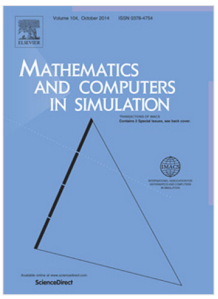

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The threshold of a stochastic SIS epidemic model with imperfect vaccination

Qun Liu[a,b], Daqing Jiang[a,c,d1], Ningzhong Shi[a], Tasawar Hayat[c,e], Ahmed Alsaedi[c]

[a] ***School of Mathematics and Statistics, Key Laboratory of Applied Statistics of MOE, Northeast Normal University, Changchun, Jilin 130024, P.R. China***

[b] ***School of Mathematics and Statistics, Guangxi Colleges and Universities Key Laboratory of Complex System Optimization and Big Data Processing, Yulin Normal University, Yulin 537000, Guangxi, P.R. China***

[c] ***Nonlinear Analysis and Applied Mathematics (NAAM) Research Group, Department of Mathematics, Faculty of Science, King Abdulaziz University, Jeddah 121589, Saudi Arabia***

[d] ***College of Science, China University of Petroleum (East China), Qingdao 266580, Shandong Province, P.R. China***

[e] ***Department of Mathematics, Quaid-i-Azam University 45320, Islamabad 44000, Pakistan***

Abstract

In this paper, we analyze the threshold R_v^S of a stochastic SIS epidemic model with partially protective vaccination of efficacy $e \in [0,1]$. Firstly, we show that there exists a unique global positive solution of the stochastic system. Then $R_v^S > 1$ is verified to be sufficient for persistence in the mean of the system. Furthermore, three conditions for the disease to die out are given, which improve the previously-known results on extinction of the disease. We also obtain that large noise will exponentially suppress the disease from persisting regardless of the value of the basic reproduction number R_v^S.

Keywords:
Stochastic SIS epidemic model; Imperfect vaccination; Threshold;

[1]Corresponding author at School of Mathematics and Statistics, Key Laboratory of Applied Statistics of MOE, Northeast Normal University, Changchun, Jilin 130024, P.R. China. E-mail address: daqingjiang2010@hotmail.com (D. Jiang).