

Einladung zum Vortrag
im Oberseminar Analysis

Mathematical modelling and analysis of Ebola epidemic considering intervention from trained teams and random fluctuations

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We investigate the transmission dynamics of Ebola epidemic by considering the interventions from trained teams as well as environmental fluctuations. Firstly, we construct and analyze a deterministic model that consists of non-linear ordinary differential equations that govern the evolution of a judiciously compartmented population. We prove the existence and uniqueness of a global positive solution, and compute the basic reproduction number \mathcal{R}_0 . Furthermore, we show that \mathcal{R}_0 serves as a threshold parameter which predicts whether the disease will persist or disappear within the community. By using numerical simulations, we study the influence of the interventions from trained teams on the disease prevalence. The sensitivity analysis is also performed. Secondly, we design a stochastic version of the previous deterministic model by perturbing some parameters by white noises. The stochastic model obtained is completely investigated. The global existence and positivity of the solution is proved. Moreover, we exhibit two stochastic basic reproduction numbers \mathcal{R}_1 and \mathcal{R}_2 , and prove that they determine the extinction and the persistence of the disease, respectively. When the noises are large or small, numerical simulations illustrate that the epidemic dies out if $\mathcal{R}_1 < 1$ whereas it persists if $\mathcal{R}_2 > 1$. Afterwards a sufficient condition for the existence of a stationary distribution is established. Numerical simulations are also provided to illustrate some theoretical results obtained as well as the effect of white noises.

**Alle Interessierten sind herzlich
eingeladen!**

Datum: Donnerstag, 08.02.2024

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