

عنوان مقاله:

Backward bifurcation analysis in SIRS-SI of the dynamics of malaria transmission model with treatment

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خلاصه مقاله:

In this paper, we developed a mathematical model which describes the dynamics of malaria transmission with treatment based on the SIRS-SI framework, using the system of ordinary differential equations (ODE). In addition, we derive a condition for the existence of equilibrium points of the model and investigate their stability and the existence of backward bifurcation for the model. Our result shows that if the reproduction number R_0 is less than 1 the disease-free equilibrium point is stable so that the disease dies out. If R_0 is greater than 1, then the disease-free equilibrium point is unstable. In this, the endemic state has a unique equilibrium and the disease persists within the human population. A qualitative study based on bifurcation theory reveals that backward bifurcation may occur. The stable disease-free equilibrium of the model coexists with the stable endemic equilibrium when the basic reproduction number is less than one. Numerical simulations were carried out using a mat lab to support our analytical solutions. And these simulations show how treatment affects the dynamics of the human and mosquito population.

کلمات کلیدی:

equilibrium points, stability, Endemic, reproduction number, Numerical Simulations

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