عنوان مقاله:

ON THE STABILITY AND THRESHOLD ANALYSIS OF AN EPIDEMIC MODEL

محل انتشار:

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خلاصه مقاله:

We consider a mathematical model of epidemic spread in which the population is partitioned into five compartments of susceptible S(t), Infected I(t), Removed R(t), Prevented U(t) and the Controlled W(t). We assume each of the compartments comprises of cohorts of individuals which are identical with respect to the disease status. We derive five systems of equations to represent each of the subpopulations. The general stability of the disease free equilibrium (DFE) and the endemic equilibrium states of the linearized model are established using the linear stability theory and the Routh-Hurwitz conditions are established and analyzed in the domain of interest. We find that the DFE is locally asymptotically stable when the infected individuals received ART and use the condom but the endemic state is unstable to initial perturbations. Also, we derive an expression for the basic reproduction number using the next generation matrix approach and find that for $R_o<1$ the DFE is stable but for $R_o>1$ is unstable.

کلمات کلیدی:

Stability, Threshold, epidemic model, HIV, AIDS