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Mathematical Analysis of HIV/AIDS Epidemic in a Heterogeneous Population

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In this paper, a nonlinear deterministic mathematical model for HIV/AIDS disease is proposed in a heterogeneous population. Here, the total population is divided in two different classes: upper class and the labour class. These classes are further categorized into four different compartments: susceptibles, the latent period of infectives, HIV-positive infectives and AIDS patients. Different rates of parameters are considered for different classes. The equilibrium and the stability of the model are discussed by using basic reproduction number R_0. If the basic reproduction number R_0 is less than 1, then the disease-free equilibrium is stable and in such a case endemic equilibrium does not exist. If R_0 is greater than 1, the endemic equilibrium exists and it is globally stable. The numerical simulations are performed to illustrate our theoretical results.

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