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AN HIV MODEL WITH INITIATING ANTIRETROVIRAL THERAPY

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Abstract. Initiating early treatment has the benefit of reducing or avoiding the irreversible damage done by HIV and opportunistic infections. The paper develops a structured model of HIV/AIDS for a population in which only the infective individuals whose infection age θ is less than τ are treated by drugs, τ is the time at which infected patients have irreversible damage to the immune system. The analytical results show there exists a globally stable infection-free state when the impulsive period T and drug-treatment proportion p satisfy $R_1(p,T,\tau) < 1$, which implies that even if the other infective individuals are not treated, this strategy can result in eradication of HIV/AIDS. Additionally the paper also analyzes the eradication of HIV as τ approaches $+\infty$.

Keywords. Impulsive differential equations; Infection age; Impulsive period; Antiretroviral therapy; Drug-treatment proportion; Infection-free state.

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