

## A Model of HIV-1 infection with intracellular delays under periodic drug treatment

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### ABSTRACT

Models including drug therapy and intracellular delays have been developed to understand the dynamics of HIV-1 infection and give better estimates of the kinetic parameters. Many of these models accounted for a single discrete or continuous delay representing the time between infection and production of new viruses by assuming that every infected cell is destined to produce viruses. Under treatment with HAART the viral replication period is divided into pre-and post-drug action allowing for two more intracellular delays: one associated with the loss of target cells by infection and the other represents the time for the newly produced virions to become infectious.

We develop and analyze a model with periodic HAART treatment that includes three delays and analytically derive, in terms of the parameters and the delays, stability conditions for the viral free and the infected steady states. We also examine the dynamics of the model numerically.

**Key Words:** HIV-1, Periodic treatment, Intracellular delay, Stability.

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