

1. In class we altered our basic  $(T, T^*, V)$  HIV model for patients given RT inhibitors as a treatment. These block infection and so  $k$  is reduced a certain amount  $(1-\eta)k$ ,  $0 \leq \eta \leq 1$ . Assume the case of a perfect inhibitor, so  $\eta = 1$ . Assume also that the patient is in a quasi-steady state condition just before treatment so that  $T_0^* = kV_0T_0/\delta$  (from (4) in class) and  $NkT_0 = c$  (from (5) in class).

Solve the model for  $V(t)$ ; i.e. show

$$V(t) = \frac{V_0}{c-\delta} \{ c e^{-\delta t} - \delta e^{-ct} \} \quad (c \neq \delta)$$

Hence the formula shows the drug therapy should reduce viral load and that the dynamics of virus loss will reflect a combination of viral clearance and loss of productively infected cells.