

$$\begin{aligned}\tau \, dr_1/dt &= -r_1 + S(-\beta r_2 - \varphi \, a_1 + I_1) \\ \tau_a \, da_1/dt &= -a_1 + f_a(r_1)\end{aligned}$$

$$\begin{aligned}\tau \, dr_2/dt &= -r_2 + S(-\beta r_1 - \varphi \, a_2 + I_2) \\ \tau_a \, da_2/dt &= -a_2 + f_a(r_2)\end{aligned}$$

$$\tau_a \gg \tau, \quad S(u) = 1/(1 + \exp[(\theta - u)/k])$$