

$$\frac{dS}{dt} = -SP\beta - S\mu_A$$

$$\frac{dI_1}{dt} = SP\beta - I_1\mu_A - I_1\gamma$$

$$\frac{dI_2}{dt} = I_1P\gamma - I_2\mu_B$$

$$\frac{dP_1}{dt} = I_1\alpha_1 + I_2\alpha_2 - P\theta$$