

$$\begin{aligned} &> \text{dexp} := 0.0004 \cdot P^2(t) - 0.06 \cdot P(t) \\ &\qquad \qquad \qquad \text{dexp} := 0.0004 P(t)^2 - 0.06 P(t) \end{aligned} \tag{1}$$

$$\begin{aligned} &> \text{ddexp} := \text{diff}(P(t), t) = \text{dexp} \\ &\qquad \qquad \qquad \text{ddexp} := \frac{d}{dt} P(t) = 0.0004 P(t)^2 - 0.06 P(t) \end{aligned} \tag{2}$$

$$\begin{aligned} &> \text{population200} := \text{dsolve}(\{\text{ddexp}, P(0) = 200\}, P(t)) \\ &\qquad \qquad \qquad \text{population200} := P(t) = -\frac{600}{e^{\frac{3t}{50}} - 4} \end{aligned} \tag{3}$$

$$\begin{aligned} &> \text{population100} := \text{dsolve}(\{\text{ddexp}, P(0) = 100\}, P(t)) \\ &\qquad \qquad \qquad \text{population100} := P(t) = \frac{300}{2 + e^{\frac{3t}{50}}} \end{aligned} \tag{4}$$

$$\begin{aligned} &> T := 23 \\ &\qquad \qquad \qquad T := 23 \end{aligned} \tag{5}$$

$$\begin{aligned} &> \text{evalf}\left(-\frac{600}{e^{\frac{3T}{50}} - 4}\right) \\ &\qquad \qquad \qquad 23905.93207 \end{aligned} \tag{6}$$

$$\begin{aligned} &> T := \text{infinity} \\ &\qquad \qquad \qquad T := \infty \end{aligned} \tag{7}$$

$$\begin{aligned} &> \text{evalf}\left(\frac{300}{2 + e^{\frac{3T}{50}}}\right) \\ &\qquad \qquad \qquad 0. \end{aligned} \tag{8}$$

$$\begin{aligned} &> T := 20 \\ &\qquad \qquad \qquad T := 20 \end{aligned} \tag{9}$$

$$\begin{aligned} &> \text{evalf}\left(-\frac{600}{e^{\frac{3T}{50}} - 4}\right) \\ &\qquad \qquad \qquad 882.5046840 \end{aligned} \tag{10}$$

$$\begin{aligned} &> \text{evalf}\left(\frac{300}{2 + e^{\frac{3T}{50}}}\right) \\ &\qquad \qquad \qquad 56.38973811 \end{aligned} \tag{11}$$

$$\begin{aligned} &> a, b := \text{solve}(\text{dexp} = 0, P(t)) \\ &\qquad \qquad \qquad a, b := 0., 150. \end{aligned} \tag{12}$$

$$\begin{aligned} &> \text{plot}\left(\left[-\frac{600}{e^{\frac{3t}{50}} - 4}, \frac{300}{2 + e^{\frac{3t}{50}}}, b\right], t = 0..20\right) \\ &\qquad \# \text{Графіки розходяться, від стійкої популяції, тому маємо нестійкий випадок} \end{aligned}$$

