Fase 1 - Actividad 1

Puntos de equilibrio $\begin{cases} p'(t) = 0 \\ d'(t) = 0 \end{cases}$; $\begin{matrix} p(0) = 30 \\ d(0) = 4 \end{matrix}$

Ecuaciones de Lotka - Volterra $\begin{cases} p'(t) = \alpha_1 p(t) - \alpha_2 p(t) d(t) \\ d'(t) = \beta_1 p(t) - \beta_2 p(t) d(t) \end{cases}$

$\bar{p} = \frac{715.7}{21} = 34.08$ $\quad \bar{d} = \frac{423.7}{21} = 20.17$

$p(t) = p(0) \cdot \exp(\alpha_1 t)$ $\quad 25.4 = 22 \cdot \exp(\alpha_1 t)$; $t = 1$

$d(t) = d(0) \cdot \exp(-\beta_1 t)$ $\quad 9.1 = 8.3 \cdot \exp(-\beta_1 t)$; $t = 1$

$\begin{cases} 25.4 = 22 \cdot \exp(\alpha_1 t) \\ 9.1 = 8.3 \cdot \exp(-\beta_1 t) \end{cases} \rightarrow \begin{matrix} \alpha_1 = \ln(1.15) = 0.1430 \\ \beta_1 = -\ln(91/83) = -0.09 \end{matrix}$

$\begin{matrix} \bar{p} = \beta_1 / \beta_2 \\ \bar{d} = \alpha_1 / \alpha_2 \end{matrix} \rightarrow \begin{matrix} \beta_2 = \beta_1 / \bar{p} = (-0.09 / 34.08) = -0.0026 \\ \alpha_2 = \alpha_1 / \bar{d} = (0.1430 / 20.17) = 0.0071 \end{matrix}$