Modelo de Población simple

$$\frac{dP}{dt} = k.P \ , \quad P(t_o) = P_0$$

$$\frac{dP}{P} = k.dt \quad ; \qquad \int_{P_0}^{P} \frac{dP}{P} = \int_{t_0}^{t} k.dt$$

$$\ln P\Big|_{P_0}^{P} = k.t\Big|_{t_0}^{t} \quad ; \quad \ln P - \ln P_0 = k.(t - t_o)$$

$$\ln\left(\frac{P}{P_0}\right) = k.(t - t_o)$$

$$\frac{P}{P_0} = e^{k.(t-t_o)} \qquad \Rightarrow \ P = P_0.e^{k.(t-t_o)}$$

Ejercicio 1

$$P(1950) = P_0$$

$$P(1960) = 250 = P_0 .\ e^{k.10}$$

$$P(1955) = P_0 .1,3 = P_0 .\ e^{k.5} \Rightarrow \cancel{P_0} .1,3 = \cancel{P_0} .\ e^{k.5}$$

$$\ln(1,3) = k.5 \quad \Rightarrow \quad k = \frac{\ln\left(1,3\right)}{5} = 0,0525$$

$$250 = P_0 .e^{0,0525.10} \quad \Rightarrow \quad P_0 = \frac{250}{e^{0,525}} = \frac{250}{1,69} \Rightarrow$$

$$P_0 = 147.889 \approx 148$$

$$\boxed{P(t) = 148\ .\ e^{0,0525.(t-1950)}}$$

$$P(1965) = 148\ .\ e^{0,0525.(1965-1950)} = 325,288 \approx 325$$