EJERCICIO 04

- $\frac{du}{dt} = u^q \quad ; \quad t \in [0, 10]$

$$\Rightarrow \int_{u_0}^{u_f} u^{-q}\, du = t_f$$

$[q = 1] \longrightarrow \ln\left[\frac{u_f}{u_0}\right] = t_f \Rightarrow$ $\boxed{u(t) = e^t \quad ; \quad u(t=0) = 1}$

$[q \neq 1] \longrightarrow \frac{1}{1-q}\left[u^{1-q}\right]_{u_0}^{u_f} = t_f \Rightarrow u_f^{1-q} - u_0^{1-q} = t_f\,[1-q]$

$$\Rightarrow \boxed{u(t) = \left[t\,[1-q] + 1\right]^{\frac{1}{1-q}} \quad ; \quad \left[t\,[1-q] + 1\right] > 0}$$