④ $\frac{du}{dt} = u^q$, $t \in [0, t_0]$

Ec. separable:

$q=1 \Rightarrow \frac{du}{dt} = u \Rightarrow \frac{du}{u} = dt \Rightarrow \int \frac{du}{u} = \int dt \Rightarrow \ln|u| = t \Rightarrow u = e^t$

$q<1$ y $t(1-q)+1 \geq 0$:

$\int \frac{du}{u^q} = \int dt \Rightarrow \frac{u^{1-q}}{1-q} = t + c \Rightarrow u^{1-q} = (t+c)(-q+1)$

$u^{1-q} = -qt + t - qc + c \Rightarrow u^{1-q} = t(1-q) + c_2$

$u(t) = [t(1-q) + c_2]^{\frac{1}{1-q}}$

Si $u(0) = 1$

$u(t) = [t(1-q) + 1]^{\frac{1}{1-q}}$