# Equazioni Differenziali Ordinarie – Problema di Cauchy

**1.1)** 
$$\begin{cases} y' = \lambda\, y, & t \in [0,T], \quad \lambda \in C \\ \qquad y(0) = 1 \end{cases}$$
$\qquad y(t) = \exp(\lambda t) \quad$ *Pb. di Dahlquist*

**1.2)** 
$$\begin{cases} y' = -2ty^2, & t \in [0,2] \\ \qquad y(0) = 1 \end{cases}$$
$\qquad y(t) = \dfrac{1}{1+t^2}$

**1.3)** 
$$\begin{cases} y' = \dfrac{y}{t} + \left(\dfrac{y}{t}\right)^2, & t \in [e, e+2] \\ \qquad y(e) = e \end{cases}$$
$\qquad y(t) = \dfrac{t}{2 - \log(t)}$

**1.4)** 
$$\begin{cases} y' = -\dfrac{1}{t}(2y + t^2 y^2), & t \in [1,5] \\ \qquad y(1) = 1 \end{cases}$$
$\qquad y(t) = \dfrac{1}{t^2(1 + \log(t))}$

**1.5)** 
$$\begin{cases} y' = \dfrac{y}{t} + \pi t \cos(\pi t), & t \in [1,3] \\ \qquad y(1) = 0 \end{cases}$$
$\qquad y(t) = t\,\mathrm{sen}(\pi t)$

**1.6)** 
$$\begin{cases} y' = -y^2, & t \in [0,10] \\ \qquad y(0) = 5 \end{cases}$$
$\qquad y(t) = \dfrac{5}{1 + 5t}$