# ESQUEMAS NÚMERICOS AM1:

- **RUNGE-KUTTA 2.**

$$
\begin{aligned}
k_1 &= F(x_i, t_i) \\
k_2 &= F(x_i + \delta t . k_1, t_i + \delta t) \\
x_{i+1} &= x_i + \frac{\delta t}{2}(k_1 + k_2)
\end{aligned}
$$

- **RUNGE-KUTTA3.**

$$
\begin{aligned}
k_1 &= F(x_i, t_i) \\
k_2 &= F(x_i + \frac{\delta t}{3}k_1, t_i + \frac{\delta t}{3}) \\
k_3 &= F(x_i + \frac{2\delta t}{3}k_2, t_i + \frac{2\delta t}{3}) \\
x_{i+1} &= x_i + \frac{\delta t}{4}(k_1 + 3k_3)
\end{aligned}
$$

- **RUNGE-KUTTA 4.**

$$
\begin{aligned}
k_1 &= F(x_i, t_i) \\
k_2 &= F(x_i + \frac{\delta t}{2}k_1, t_i + \frac{\delta t}{2}) \\
k_3 &= F(x_i + \frac{\delta t}{2}k_2, t_i + \frac{\delta t}{2}) \\
k_4 &= F(x_i + \delta t . k_3, t_i + \delta t) \\
x_{i+1} &= x_i + \frac{\delta t}{6}(k_1 + 2k_2 + 2k_3 + k_4)
\end{aligned}
$$