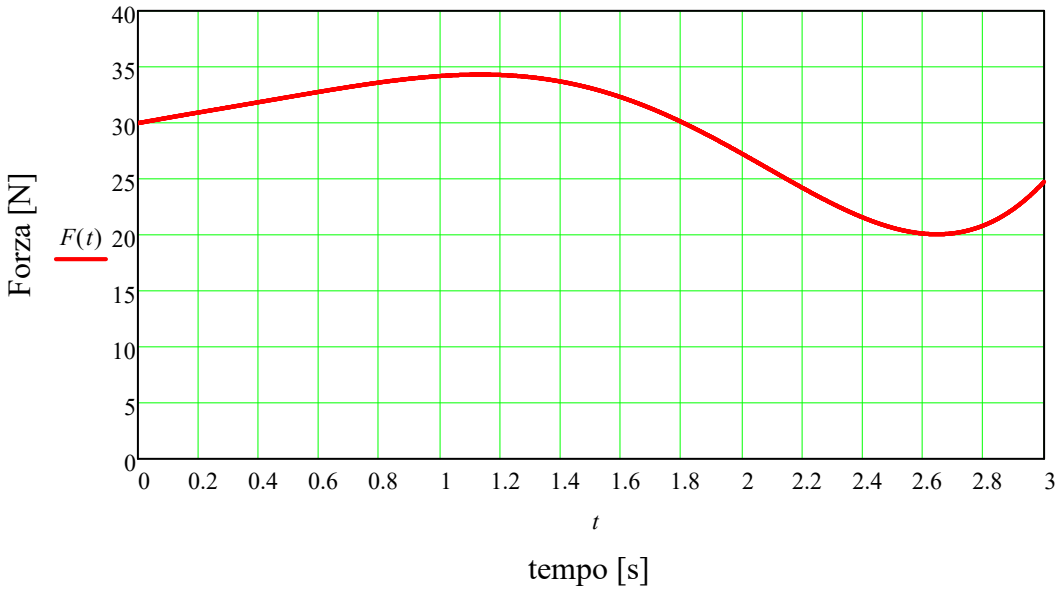
## Integrazione numerica dell'equazione di moto

$$m \cdot x'' + c \cdot x' + k \cdot x = F(t)$$

$$F(t) := \sin(t) \cdot \left(-3 \cdot t^3 + 5t^2 - 2 \cdot t + 5\right) + 30$$

$$\Delta t := 10^{-3} = 1 \times 10^{-3} \qquad T_{max} := 3$$

$$t := 0, \Delta t .. T_{max}$$




$$m := 20$$

$$c := 120$$

$$k := 1500 \qquad \omega := \sqrt{\frac{k}{m}} = 8.66 \qquad \xi := \frac{c}{2 \cdot m \cdot \omega} = 34.641 \cdot \% \qquad \omega_s := \omega \cdot \sqrt{1 - \xi^2} = 8.124$$

$$x_0 := 0$$

$$v_0 := 0$$

$$y := \begin{pmatrix} x_0 \\ v_0 \end{pmatrix} = \begin{pmatrix} 0 \\ 0 \end{pmatrix}$$

$$EQMOTO(t, y) := \begin{bmatrix} y_2 \\ \frac{1}{m} \cdot \left(F(t) - c \cdot y_2 - k \cdot y_1\right) \end{bmatrix}$$

$$T_{max} = 3$$

$$\omega = 8.66 \qquad \tau := \frac{2 \cdot \pi}{\omega} = 0.726$$

$$\Delta t_{cons} := \frac{1}{20} \cdot \tau = 0.036$$ Passo di calcolo consigliato

$$\Delta t = 1 \times 10^{-3} \qquad N := ceil\left(\frac{T_{max}}{\Delta t}\right) = 3000$$

$$TAB := rkfixed(y, 0, T_{max}, N, EQMOTO)$$ Metodo numerico di Runge-Kutta

$$tempo := TAB^{\langle 1 \rangle} \qquad SPO := TAB^{\langle 2 \rangle} \qquad VEL := TAB^{\langle 3 \rangle}$$

$$ACC := \overrightarrow{\left[\frac{1}{m} \cdot (F(tempo) - c \cdot VEL - k \cdot SPO)\right]}$$