

Trasformate di Laplace delle seguenti funzioni

$$\delta(t)$$

$$1(t)$$

$$r(t)$$

$$p(t)$$

$$e^{-t}$$

$$\cos(\omega t)$$

$$\sin(\omega t)$$

$$t$$

$$t^2$$

$$t^3$$

$$t e^{-3t}$$

$$e^{-2t} \cos(5t)$$

$$e^{-2t} \sin(5t)$$

Risolvere i seguenti problemi facendo uso della trasformata di Laplace

$$(a) \frac{d^2 y}{dt^2} + 2 \frac{dy}{dt} + 2y = 0, \quad y(0) = 1, \quad \frac{dy(0)}{dt} = -1$$

$$(b) \frac{d^2 y}{dt^2} + 2 \frac{dy}{dt} + 2y = 2, \quad y(0) = 0, \quad \frac{dy(0)}{dt} = 1$$

$$(c) \frac{d^2 y}{dt^2} + 2 \frac{dy}{dt} + 2y = \delta(t-1), \quad y(0) = 1, \quad \frac{dy(0)}{dt} = -1$$

$$(d) \frac{d^2 y}{dt^2} + 2 \frac{dy}{dt} + 2y = f(t), \quad y(0) = y_0, \quad \frac{dy(0)}{dt} = y'(0)$$