1. Calcular a transformada de Laplace:

$$\text{(a)} \ f(t) = \cos(\omega t + \theta) \tag{1}$$

$$\text{(b)} \ f(t) = \cos(t)\sin(t) \tag{2}$$

2. Achar a transformada inversa:

$$\text{(a)} \ F(s) = \frac{s+1}{s^3 + s^2 - 6s} \tag{3}$$

$$\text{(b)} \ F(s) = \frac{2}{s} + \frac{1}{s+2} \tag{4}$$

$$\text{(c)} \ F(s) = \frac{1}{(s^2 + \omega^2)^2} \tag{5}$$

3. Resolver as equações diferenciais:

$$\text{(a)} \ \ddot{x} + \pi^2 x = t^3 \text{ com } x(0) = 6/\pi^4, \dot{x}(0) = 0 \tag{6}$$

$$\text{(b)} \ \ddot{x} + k\dot{x} - 2k^2 x = 0 \text{ com } x(0) = 2, \dot{x}(0) = 2k \tag{7}$$

$$\text{(c)} \ \ddot{x} - 2\dot{x} + x = \exp t + t \text{ com } x(0) = 0, \dot{x}(0) = 0 \tag{8}$$

$$\text{(d)} \ \ddot{x} + 2\dot{x} + 2x = r(t) \text{ com } x(0) = 0, \dot{x}(0) = 0 \tag{9}$$

$$r(t) = \begin{cases} t & \text{se } 0 < t \leq 1 \\ t^2 & \text{se } 1 < t \end{cases}$$

$$\text{(e)} \ \ddot{x} + 2\dot{x} - 3x = \delta(t-2) + \delta(t-3) \text{ com } x(0) = 0, \dot{x}(0) = 0 \tag{10}$$