

$$f(t) = t \cos 2t: \quad \mathcal{L}f = \frac{s^2 - 4}{(s^2 + 4)^2}$$

$$\underline{y} + 2\underline{y} - 3y = 10 \sinh 2t / \underline{y}(0) = 0 / \underline{y}(0) = 4: \quad y = \frac{5}{3}e^{-2t} + e^{2t} - \frac{2}{3}e^t - 2e^{-3t}$$

$$\underline{y} + 4\underline{y} + 6y = 1 + e^{-t} / \underline{y}(0) = 0 / \underline{y}(0) = 0: \quad y = \frac{1}{6} + \frac{1}{3}e^{-t} - \frac{1}{2}e^{-2t} \cos \sqrt{2}t - \frac{\sqrt{2}}{3}e^{-2t} \sin \sqrt{2}t$$

$$\underline{y} + 2\underline{y} + y = 2 \cos t / \underline{y}(0) = 3 / \underline{y}(0) = 0: \quad y = \sin t + 2te^{-t} + 3e^{-t}$$