

Exercise 1. Solve the IVPs by the Laplace transform. If necessary, use partial fraction expansion.

a. $y' + 5.2y = 19.4 \sin 2t$, $y(0) = 0$

b. $y'' - \frac{1}{4}y = 0$, $y(0) = 12$, $y'(0) = 0$

c. $y'' + 7y' + 12y = 21e^{3t}$, $y(0) = 3.5$ $y'(0) = -10$

Exercise 2. By using the relations for the Laplace transform of the derivatives, find $\mathcal{L}(f)$ if $f(t)$ equals:

a. te^{-at} , with a constant

b. $\sin^2(\omega t)$, with ω constant

Exercise 3. By using the relation for the Laplace transform of the integral, find $f(t)$ if $\mathcal{L}(f)$ equals:

a. $\frac{3}{s^2 + \frac{s}{4}}$

b. $\frac{1}{s(s^2 + \omega^2)}$