

Dr. Z.'s Calc5 Homework assignment 6

Use the Laplace Transform method to solve the systems of differential equations.

1.

$$\begin{aligned}\frac{dx}{dt} &= -x + y \quad , \\ \frac{dy}{dt} &= 2x \quad , \\ x(0) = 0 \quad , \quad y(0) &= 1 \quad .\end{aligned}$$

2.

$$\begin{aligned}\frac{dx}{dt} &= -x + 5y \quad , \\ \frac{dy}{dt} &= -2x + y \quad , \\ x(0) = 2 \quad , \quad y(0) &= -1 \quad .\end{aligned}$$

3.

$$\begin{aligned}\frac{d^2x}{dt^2} + 3\frac{dy}{dt} + 3y &= 0 \quad , \\ \frac{d^2x}{dt^2} + 3y &= te^{-t} \quad , \\ x(0) = 2 \quad , \quad x'(0) &= 2 \quad , \quad y(0) = 0 \quad .\end{aligned}$$

4.

$$\begin{aligned}\frac{d^2x}{dt^2} &= \frac{5}{2}x - \frac{3}{2}y \\ \frac{d^2y}{dt^2} &= -\frac{3}{2}x + \frac{5}{2}y \\ x(0) = 2 \quad , \quad x'(0) &= 3 \quad ; y(0) = 0 \quad , \quad y'(0) = -1 \quad .\end{aligned}$$