Assignment Sheet - 10

1. Use Laplace transform to solve the initial value problem \( \frac{df}{dt} + 2f = \cos t \), \( f(0) = 1 \).

2. Solve the system \( \frac{dx}{dt} = 2x - 3y \), \( \frac{dy}{dt} = y - 2x \), \( x(0) = 2 \), \( y(0) = 1 \) by the Laplace transform.

3. Use Laplace transform to solve \( \frac{d^3f}{dt^3} + \frac{d^2f}{dt^2} = 3e^{-4t} \), \( f(0) = 0 \), \( f'(0) = -1 \), \( f''(0) = 1 \).

4. Use Laplace transform to solve the partial differential equation \( \frac{\partial f}{\partial x} - 2 \frac{\partial f}{\partial t} = y \), \( f(x, 0) = 5e^{-x} \).

5. Use Laplace transform to find the solution of \( \frac{\partial u}{\partial t} - 2 \frac{\partial^2 u}{\partial x^2} = 0 \) \( u(0, t) = u(5, t), u(x, 0) = 10 \sin 4\pi x \).