Ecuaciones Diferenciales

1) Use la Transformada de Laplace para resolver los siguientes problemas de valores iniciales.

1. $y'' + 9y = e^t, \quad y(0) = 0, \quad y'(0) = 0$

2. $y'' - 4y' = 6e^{3t} - 3e^{-t}, \quad y(0) = 1, \quad y'(0) = -1$

3. $y'' - 4y' + 4y = t^3 e^{2t}, \quad y(0) = 0, y'(0) = 0$

4. $y'' - 6y' + 9y = t, \quad y(0) = 0, y'(0) = 1$

5. $y'' - 4y' + 4y = t^3, \quad y(0) = 1, y'(0) = 0$

6. $y'' + y = \sqrt{2}\,\text{sen}\sqrt{2}t, \quad y(0) = 10, \quad y'(0) = 0$

7. $y' + y = f(t), \quad y(0) = 0, \text{ donde } f(t) = \begin{cases} 0, & 0 \le t < 1 \\ 5, & t \ge 1 \end{cases}$

8. $y'' + 4y = \text{sen}\, t\, \mathcal{U}(t - 2\pi), \quad y(0) = 1, y'(0) = 0$

9. $y'' - 5y' + 6y = \mathcal{U}(t - 1), \quad y(0) = 0, y'(0) = 1$

10. $y' + y = t\,\text{sen}\, t, \quad y(0) = 0$

11. $y' - y = te^t\,\text{sen}\, t, \quad y(0) = 0$

12. $y'' + y = \text{sen}\, t, \quad y(0) = 1, \quad y'(0) = -1$

13. $y'' + 9y = \cos 3t, \quad y(0) = 2, \quad y'(0) = 5$