ECE 365 - QUIZ 2 01/25/2000

NAME: KEY
Honor Code:

Solve for $x(t)$ assuming all IC's are 0.

$$\frac{d^2x(t)}{dt^2} + \frac{dx(t)}{dt} + 2x(t) = 25u(t)$$

$$[D^2 + D + 2]X(D) = \frac{25}{D}$$

$$X(D) = \frac{25}{D(D^2+D+2)}$$

$$= \frac{25/2}{D} + \frac{-\frac{25}{2}D - \frac{25}{2}}{D^2+D+2}$$

$$= \frac{25/2}{D} + \left(\frac{-25}{2}\right)\frac{(D+1/2)}{(D+1/2)^2+\left(\sqrt{\frac{7}{4}}\right)^2} + \left(\frac{-25}{2\sqrt{7}}\right)\frac{\sqrt{7/4}}{(D+1/2)^2+\left(\sqrt{7/4}\right)^2}$$

$$x(t) = \left[\frac{25}{2} - \frac{25}{2}e^{-1/2t}\cos\sqrt{\frac{7}{4}}t - \frac{25}{2\sqrt{7}}e^{-1/2t}\sin\sqrt{\frac{7}{4}}t\right]u(t)$$