



SHEET NO (5)

3.1. Find the Laplace transform of

(a) $x(t) = -e^{-at}u(-t)$

(b) $x(t) = e^{at}u(-t)$

3.17. Find the inverse Laplace transform of the following $X(s)$:

(a) $X(s) = \frac{2s + 4}{s^2 + 4s + 3}, \text{Re}(s) > -1$

(b) $X(s) = \frac{2s + 4}{s^2 + 4s + 3}, \text{Re}(s) < -3$

(c) $X(s) = \frac{2s + 4}{s^2 + 4s + 3}, -3 < \text{Re}(s) < -1$

3.30. Consider a continuous-time LTI system for which the input $x(t)$ and output $y(t)$ are related by

$$y''(t) + y'(t) - 2y(t) = x(t) \quad (3.86)$$

(a) Find the system function $H(s)$.

(b) Determine the impulse response $h(t)$ for each of the following three cases: (i) the system is causal, (ii) the system is stable, (iii) the system is neither causal nor stable.