EEEN 352 System Dynamics and Control

Homework 01

Due: 06-March-2020
Friday 17:00

Problem 1) Obtain the Laplace transform of the function $f(t)$ shown in Figure P1 as follows

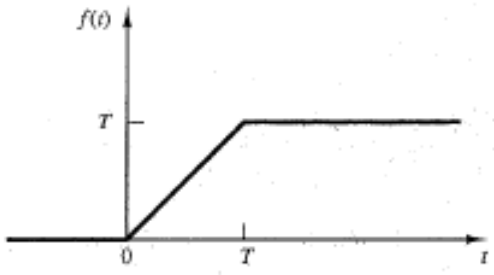

Figure P1

Problem 2) By applying the final-value theorem, find the final value of $f(t)$ whose Laplace transform is given by

$$F(s) = \frac{s+1}{s^2(s+2)}$$

Verify this result by taking the inverse Laplace transform of $F(s)$ and letting $t \to \infty$.

Problem 3) Find the inverse Laplace transform of each of the following functions:

a) $F(s) = \frac{-s+1}{s^2+3s+1.25}$

b) $G(s) = \frac{3s+1}{(s+2)(s+1)^2}$

Problem 4) Solve the following differential equation

$$\frac{d^2x}{dt^2} + 7\frac{dx}{dt} + 10x = 5\cos(2t)$$

with zero initial conditions.

Problem 5) Obtain the transfer function $V_0(s)/\,V_i(s)$ of the electrical circuit shown in Figure P5 as

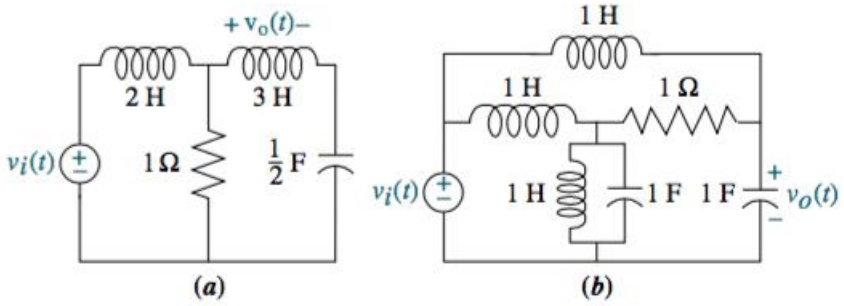

Figure P5