

Homework Assignment #7

Reading Assignment:

Chapter 17 in Electric Circuits, 8th Edition by Nilsson
 Chapter 7 in Linear Systems and Signals, 2nd Edition by Lathi

Problem Assignment:

Note: The use of integral tables is recommended for many of the assigned problems.

- 1) Work the following Ch. 17 problems in Electric Circuits, 8th Edition by Nilsson:
 1, 2, 3, 4, 22, 28a, 37, 39
- 2) Work the following Ch. 7 problems in Linear Systems and Signals, 2nd Edition by Lathi:
 7.1-4, 7.1-6, 7.2-4, 7.3-3, 7.3-7

Selected Answers:

$$17.1) \quad a) F(w) = \frac{-j4\pi A}{\pi^2 - 4w^2} \sin(2w) \quad b) v(t) = \frac{4A}{wT^2} \left[1 - \cos\left(\frac{w\tau}{2}\right) \right]$$

$$17.37) \quad a) f(t) = \frac{1/\pi}{1+t^2} \quad b) W = \frac{1}{2\pi} \text{ J} \quad c) W = \frac{1}{2\pi} \text{ J} \quad d) w_1 = \frac{1}{2} \ln(10) \approx 1.15 \text{ rad/s}$$

$$7.1-4) \quad a) X(w) = \frac{1 - e^{-(jw+a)T}}{jw + a} \quad b) X(w) = \frac{1 - e^{-(jw+a)T}}{jw - a}$$

$$7.1-6) \quad a) x(t) = \frac{(w_o^2 t^2 - 2) \sin(w_o t) + 2w_o t \cos(w_o t)}{\pi^3} \quad b) x(t) = \frac{\sin(2t) + \sin(t)}{\pi}$$

$$7.2-4) \quad a) x(t) = \frac{w_o}{\pi} \text{sinc}[w_o(t - t_o)] \quad b) x(t) = \frac{1 - \cos(w_o t)}{\pi t}$$

$$7.3-3) \quad a) X(w) = \frac{j4}{w} \sin^2\left(\frac{wT}{2}\right) \quad b) X(w) = \frac{1}{1-w^2} (1 + e^{-j\pi w})$$

$$c) \frac{1}{1-w^2} (jw + e^{-j\pi w/2}) \quad d) X(w) = \frac{1}{jw + a} (1 - e^{-(a+jw)T})$$

$$7.3-7) \quad a) x(t) = \frac{2}{\pi} \text{sinc}(t) \cos(4t) \quad b) x(t) = \frac{2}{\pi} \text{sinc}^2(t) \cos(4t)$$