

EE 311 Homework # 2. (Fall 2021)

Problems from textbook:

1.24, 1.26, 1.31, 1.38, 1.39

1.24 For each of the following functions, indicate if its waveform exhibits even symmetry, odd symmetry, or neither.

(a) $x_1(t) = u(t - 3) + u(-t - 3)$

(b) $x_2(t) = \sin(2t) \cos(2t)$

(c) $x_3(t) = \sin(t^2)$

1.26 Determine the period of each of the following waveforms.

(a) $x_1(t) = \sin 2t$

(b) $x_2(t) = \cos\left(\frac{\pi}{3} t\right)$

(c) $x_3(t) = \cos^2\left(\frac{\pi}{3} t\right)$

* (d) $x_4(t) = \cos(4\pi t + 60^\circ) - \sin(4\pi t + 60^\circ)$

(e) $x_5(t) = \cos\left(\frac{4}{\pi} t + 30^\circ\right) - \sin(4\pi t + 30^\circ)$

1.31 Determine the period of each of the following functions.

(a) $x_1(t) = (3 + j2)e^{j\pi t/3}$

(b) $x_2(t) = (1 + j2)e^{j2\pi t/3} + (4 + j5)e^{j2\pi t/6}$

(c) $x_3(t) = (1 + j2)e^{jt/3} + (4 + j5)e^{jt/2}$

1.38 Compute the energy of the following signals.

(a) $x_1(t) = e^{-at} u(t)$ for $a > 0$

(b) $x_2(t) = e^{-a|t|}$ for $a > 0$

(c) $x_3(t) = (1 - |t|) \text{rect}(t/2)$

1.39 Compute the average power of the following signals.

(a) $x_1(t) = e^{jat}$ for real-valued a

(b) $x_2(t) = (3 - j4)e^{j7t}$

* (c) $x_3(t) = e^{j3}e^{j5t}$