Digital Signal Processing: COSC360

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Review Material

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Solve each problem involving complex numbers below.

1. Find the phase angle: (a) $z = -2 + 2j$ (b) $z = -2 - 2j$ (c) $z = 2 - 2j$
2. What phasor best represents the following sinusoids at $t = 0$? (a) $v(t) = 4\,\mathsf{cos}(2\pi(10.0)t + 30°)$. (b) $v(t) = 2\,\mathsf{sin}(2\pi(10.0)t - 60°)$.

Fourier Analysis

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As we have done in class, compute the Fourier transform of the square wave:

$$f(x) = \begin{cases} 1, & 0 \leq x < \pi \\ 0, & \pi < x \leq 2\pi \end{cases} \tag{1}$$

Answer the following questions:

1. What is the phases versus frequency?
2. When does the magnitude of the Fourier transform equal zero?

Probability and Statistics

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Consider the *uniform distribution*, in which a random variable is measured in the range $[0, 1]$, and is equally probable to be found anywhere in that range.

1. Write an equation $p(x)$ for the uniform distribution, and make sure that it is normalized. That is, if you integrate over $[0, 1]$, that the result is a probability of 1.0.
2. What is the statistical mean of this distribution?
3. What is the standard deviation of this distribution?