CT111: Introduction to Communication Systems

In-Class Quiz 1

Date: Friday 19th January, 2018

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1. A complex exponential phasor is a mathematical function of four parameters: amplitude A, time t, frequency f, and initial phase θ.

   (a) Write the mathematical expression of this complex phasor, and

   (b) Show what this phasor looks like in the complex-number plane.

   Take $A = 2$ Volts, $f = 2$ Hz, and $\theta = 45^0$.

   (a) Draw the time-domain diagram over a range of time t from 0 seconds to 1 second.

   (b) Draw its frequency-domain diagram over a range of frequency f from -4 Hz to $+4$ Hz.

2. A complex exponential phasor completes one cycle in 3 seconds. This phasor is sampled in time domain once every 0.5 seconds.

   (a) Draw in the complex-number plane the samples of this phasor collected over 3 seconds.

   (b) *What* is the *polynomial* equation that these samples are the solutions of?

   (c) *Why* are they the solutions of the polynomial equation that you have provided as the answer to Question 2b?

3. Explain the following:

   (a) What is the meaning, or definition, of frequency f?

   (b) How can the frequency f be negative?