



► Pre-course Materials

► Topic 1: Course Overview

► Topic 2: Lossless Source Coding: Hamming Codes

► Topic 3: The Frequency Domain

► Topic 4: Lossy Source Coding

► Topic 5: Filters and the Frequency Response

▼ Topic 6: The Discrete Fourier Transform

6.1 Complex Numbers

Week 3 Quiz due Nov 16, 2015 at 15:30 UTC

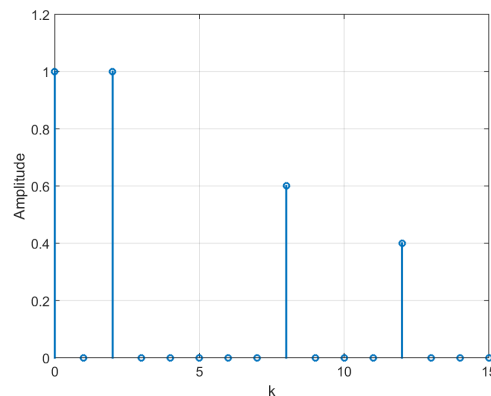
6.2 Complex Exponentials

Week 3 Quiz due Nov 16, 2015 at 15:30 UTC

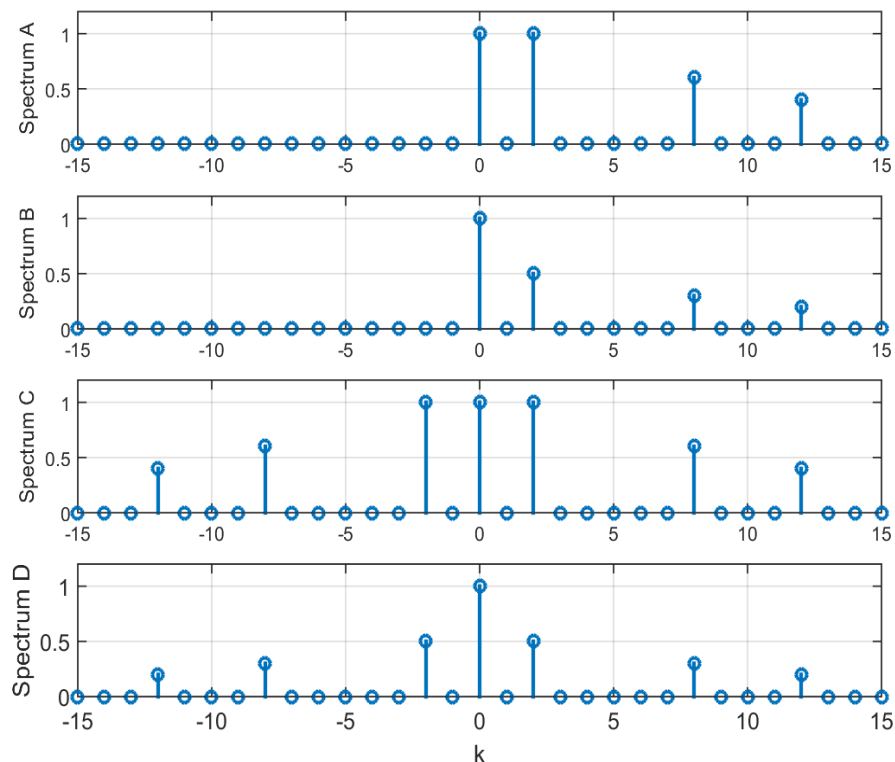
6.3 Aliasing

6.4 QUIZ QUESTION 1 (1 point possible)

Consider a signal whose Fourier **Series** amplitude spectrum is shown below:



Consider the following Fourier **Transform** amplitude spectra:



Which of Fourier Transform amplitude spectra above corresponds to the signal?

Week 3 Quiz due Nov
16, 2015 at 15:30 UTC

6.4 Discrete Fourier Transform

Week 3 Quiz due Nov
16, 2015 at 15:30 UTC

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☐ Spectrum A

☐ Spectrum B

☒ Spectrum C ✗

☐ Spectrum D ✓

EXPLANATION

For the Fourier Transform, the frequency components at nonzero frequency in the Fourier Series are replicated at corresponding positive and negative locations with half the amplitude.

You have used 2 of 2 submissions

6.4 QUIZ QUESTION 2 (1/1 point)

Suppose that the Fourier Series expansion of a signal has the following amplitude and phase spectra:

$$A_k = \frac{2}{\sqrt{1.64 - 1.6 \cos(2\pi k/16)}}$$

$$\phi_k = \arctan\left(\frac{0.8 \sin(2\pi k/16)}{1 - 0.8 \cos(2\pi k/16)}\right)$$

Find the real and imaginary parts of the Fourier Transform coefficient X_4 for the same waveform.

What is the real part to two decimal places (e.g. 3.14)?

0.61

✓ Answer: 0.6098

0.61

What is the imaginary part to two decimal places?

✓ Answer: 0.4878

EXPLANATION

Since $X_4 = \frac{A_4}{2} e^{j\phi_k}$, the real part is $\frac{A_4}{2} \cos(\phi_4)$.

Similarly, the imaginary part is $\frac{A_4}{2} \sin(\phi_4)$.

You have used 2 of 3 submissions

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