



► 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

▼ Topic 7: Signal Transmission - Modulation

7.1 Radio Spectrum

7.2 Modulation

Week 4 Quiz due Nov 23, 2015 at 15:30 UTC

7.2 QUIZ QUESTION 1 (1/1 point)

Suppose a 120Hz cosine wave modulates a 1kHz cosinusoidal carrier signal. The resulting signal consists of two cosines with what frequencies?

Low frequency:

Hz



Answer: 880

High frequency

Hz



Answer: 1120

EXPLANATION

Multiplying a cosine with frequency f_1 and a cosine with frequency f_2 results in the sum of two cosines, one at frequency $f_1 + f_2$ and one at frequency $f_1 - f_2$.

You have used 1 of 3 submissions

7.2 QUIZ QUESTION 2 (1/1 point)


The product $\sin(2\pi \cdot 9t) \cdot \sin(2\pi \cdot 200t)$ can be expressed as

☒ $0.5 \cos(2\pi \cdot 191t) - 0.5 \cos(2\pi \cdot 209t)$

☐ $0.5 \sin(2\pi \cdot 191t) - 0.5 \sin(2\pi \cdot 209t)$

☐ $0.5 \cos(2\pi \cdot 191t) + 0.5 \cos(2\pi \cdot 209t)$

7.3 Modulation with Complex Exponentials

Week 4 Quiz due Nov 23, 2015 at 15:30 UTC 

► Topic 8: Signal Transmission - Demodulation

► MATLAB download and tutorials

► MATLAB Sandbox

☐ $0.5 \sin(2\pi \cdot 191t) + 0.5 \sin(2\pi \cdot 209t)$

EXPLANATION

Subtracting the second equation below from the first,

$$\cos(A - B) = \cos(A) \cos(B) + \sin(A) \sin(B)$$

$$\cos(A + B) = \cos(A) \cos(B) - \sin(A) \sin(B)$$

results in

$$\cos(A - B) - \cos(A + B) = 2 \sin(A) \sin(B)$$

$$\text{Thus, } \sin(A) \sin(B) = 0.5 * \cos(A - B) - 0.5 * \cos(A + B).$$

You have used 2 of 2 submissions

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