9.3 QUIZ QUESTION 1 (1 point possible)

The waveform $\cos(2\pi f_0 t - \pi/8)$ can be expressed as $A \cdot \cos(2\pi f_0 f) + B \cdot \sin(2\pi f_0 t)$.

Find the numerical value of A to two decimal places (e.g. 3.14).

1.41 ✖ **Answer:** 0.924

1.41

Find the numerical value of B to two decimal places.

1.41 ✖ **Answer:** 0.383

1.41

EXPLANATION

Using the trigonometric identity in the hint,

$$\cos(2\pi f_0 t - \pi/8) = \cos(2\pi f_0 t) \cdot \cos(-\pi/8) - \sin(2\pi f_0 t) \cdot \sin(-\pi/8$$

Thus, $A = \cos(-\pi/8) \approx 0.924$ and $B = -\sin(\pi/8) \approx 0.383$.

You have used 3 of 3 submissions

9.3 QUIZ QUESTION 2 (1/1 point)

Given the same available bandwidth, Quadrature Phase Shift Keying (QPSK) can transmit digital data twice as quickly as Binary Phase Shift Keying (BPSK) because

◉ the signals m_i and m_q are transmitted by carriers with the same frequency but two different phases. ✔

- the carrier frequency for QPSK is chosen to be twice that of BPSK.
- two bit streams are transmitted simultaneously by varying the amplitude of the carrier among four different values.
- the waveforms encoding the bit sequences are created using a bit period that is half that used for BPSK.

EXPLANATION

In QPSK, two bit sequences are encoded by signals m_i and m_q whose amplitude switches between +A and -A depending upon the bit being transmitted. The signal m_i modulates a carrier $\cos(2\pi ft)$. The signal m_q modulates a carrier $\sin(2\pi ft) = \cos(2\pi ft - \pi/2)$. The two bit sequences are transmitted simultaneously by transmitting the sum of the two modulated carriers.

You have used 1 of 2 submissions


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