Mentor

FAO

Progress

Х reviewer3@nptel.iitm.ac.in v Courses » Principles of Digital Communications

Course

Unit 11 - Week 10

Course

outline

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Phase

Keying

Minimum Shift

Keying – I

How to access the portal

Assignment 10

Announcements

The due date for submitting this assignment has passed. Due on 2018-10-10, 23:59 IST. As per our records you have not submitted this assignment.

Ask a Question

1) A QPSK signal over AWGN channel uses one of the four equiprobable signals **1** point $s_i(t) = A ext{cos} \Big(2 \pi f_c t + i \, rac{\pi}{2} \Big)$, where $\, i=0,1,2,3$ and f_c is the carrier frequency, and the duration of each signal is \vec{T} . Assume input to the QPSK system is a random binary sequence in which symbols/bits 1 and 0 are equally likely, and the symbols/bits in different time slots are statistically independent and identically distributed. Assume channel noise with power spectral density $\frac{N_0}{2}$. With Gray encoding of the signals, the probability of bit error P_b is $P_b = Qigg(\sqrt{rac{2A^2T}{N_0}}igg)$ $P_b = Q \Big(\sqrt{rac{A^2 T}{2 N_0}} \Big)$ $P_b = 2Q \Big(\sqrt{1-2} \Big)$ Lecture 50 : Quadrature Phase Shift Keying - III $P_b = 2Q \Big(\sqrt{rac{A^2T}{2N_0}} \Big)$ Lecture 51 : Continuous No, the answer is incorrect. **Frequency Shift** Score: 0 **Accepted Answers:** Lecture 52 :

 $P_b = Q$

or If in American 1 instead of APSK hinary coherent FSK signals are used with

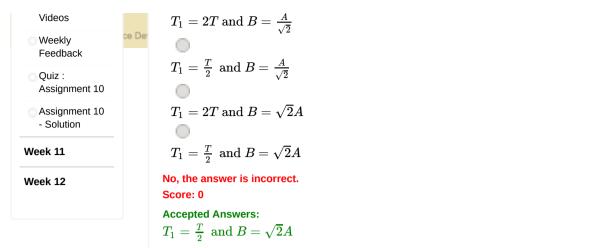
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Friday 09 November 2018 10:05 AM



3) A QPSK signal over an AWGN channel uses one of the four equiprobable **1** point

$$ext{signals } s_i(t) = \left\{ egin{array}{c} \sqrt{rac{2E}{T}}\cos\Big[2\pi f_c t + (2i-1)rac{\pi}{4}\Big], & 0 \leq t \leq T \ 0, & elsewhere \end{array}
ight. where i=1,2,3,4$$
 ,

power spectral density $S_i(f)$ of an offset QPSK signal produced by a random binary sequence in which symbols/bits 1 and 0 are equally likely, and the symbols/bits in different time slots are statistically independent and identically distributed, in terms of the bit energy E_b and bit duration T_b , is

$$S_{i}(f) = E_{b} \Big[\operatorname{sinc}^{2} 2T_{b}(f - f_{c}) + \operatorname{sinc}^{2} 2T_{b}(f + f_{c}) \Big]$$

$$S_{i}(f) = 4E_{b} \Big[\operatorname{sinc}^{2} 2T_{b}(f - f_{c}) + \operatorname{sinc}^{2} 2T_{b}(f + f_{c}) \Big]$$

$$S_{i}(f) = 2E_{b} \Big[\operatorname{sinc}^{2} 2T_{b}(f - f_{c}) + \operatorname{sinc}^{2} 2T_{b}(f + f_{c}) \Big]$$

$$S_{i}(f) = \frac{E_{b}}{2} \Big[\operatorname{sinc}^{2} 2T_{b}(f - f_{c}) + \operatorname{sinc}^{2} 2T_{b}(f + f_{c}) \Big]$$
No, the answer is incorrect.

Score: 0

Accepted Answers:

$$S_i(f) = E_b \left| \mathrm{sinc}^2 2T_b(f-f_c) + \mathrm{sinc}^2 2T_b(f+f_c)
ight|$$

4) A continuous-phase FSK signal is represented **0.5** points by $s(t) = \pm \sqrt{\frac{2E_b}{T_b}} \cos\left(\frac{\pi t}{2T_b}\right) \cos(2\pi f_c t) \pm \sqrt{\frac{2E_b}{T_b}} \sin\left(\frac{\pi t}{2T_b}\right) \sin(2\pi f_c t), 0 \le t \le 2T_b$. Envelop of the signal is given by

$$\sqrt{\frac{2E_b}{T_b}} \sin\left(\frac{\pi t}{2T_b}\right)$$

$$\sqrt{\frac{2E_b}{T_b}} \cos\left(\frac{\pi t}{2T_b}\right)$$

$$\sqrt{\frac{2E_b}{T_b}}$$

$$\sqrt{\frac{2E_b}{T_b}}$$

$$\frac{2E_b}{T_b}$$

