Unit 15 - Week 10- Bayes Theorem, Maximum Aposteriori Probability (MAP) Receiver, Random Variables and PDF, Power of Fading Wireless Channel, Mean & Variance of Random Variables and Application:Average & RMS Delay Spread

Course outline

How does an NPTEL online course work?

Week-0

Week 1-Basic tools for communication, Fourier Series/Transform, Properties, Parsevals Relation, Properties of Fourier Transform, LTI Systems

Week 2- Cross- and Auto-correlation, (ESD), Introduction to Amplitude Modulation (AM), Spectrum of AM, Envelope Detection, Power Efficiency, (DSB-SC) Modulation and Demodulation

Week-3- Power Efficiency, (DSB-SC) Modulation and Demodulation, Carrier Phase Offset Example for (DSB-SC), Costas Receiver

Week-4 Quadrature Carrier Multiplexing (QCM) and Demodulation of QCM signals, Single Sideband Modulation (SSB), Hilbert Transform

Week-5 Generation of SSB , Complex pre-envelope of QCM, VSB , Introduction to AM

Week-6 Narrowband FM Generation, Spectrum of FM Signals, Carson's Rule for FM Bandwidth, Narrowband FM Generation, FM Demodulation, Introduction to Sampling, Spectrum of Sampled Signal, Aliasing, Nyquist Criterion

Week 7- Signal Reconstruction from Sampled Signal ,Introduction to Pulse Amplitude Modulation, Spectrum of PAM Signal and Reconstruction, Quantization, Uniform Quantizers – Midrise and Midtread, Quantization noise, Lloyd Max Quantization Algorithm, Non-uniform Quantizers

Week 8- Delta Modulation, Differential Pulse Code Modulation, Frequency Mixing and Translation in Communication Systems, Heterodyne and Super Heterodyne Receivers, Frequency Division Multiplexing, Time Division Multiplexing, T1 TDM System: Case Study

Week 9 - Basics of Probability, Conditional Probability, Independent Events - Mary-PAM Example, Independent Events-Block Transmission, Independent Events-Multiantenna Fading

Text Transcripts

DOWNLOAD VIDEOS

Week 10- Bayes Theorem, Maximum Aposteriori Probability (MAP) Receiver, Random Variables and PDF, Power of Fading Wireless Channel, Mean & Variance of Random Variables and Application:Average & RMS Delay Spread

- Lec 59 - Bayes Theorem
- Lec 60 - Maximum Aposteriori Probability (MAP) Receiver
- Lec 61- Random Variables and PDF
- Lec 62 - Power of Fading Wireless Channel
- Lec 63 - Mean & Variance of Random Variables
- Lec 64 - Application:Average & RMS Delay Spread
- Quiz : Assignment-10
- Feedback For Week 10
- Solution-10

Week 11 - Transformation of Random Variables, Gaussian Random Variable ,Special Case: IID Gaussian Random Variables, Application: Uniform Linear Arrays, Random Processes and (WSS) and WSS Examlpe

Week 12- Power Spectral Density(PSD) for WSS Random Process, PSD Application in Wireless, WSS Random Process Through LTI System, Special Random Processes and Gaussian Process Through LTI System

Assignment-10

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2020-04-08, 23:59 IST.

1) The conditional probability $P(A|B)$ equals *1 point*

- $\frac{P(B)}{P(A\cap B)}$
- $P(B)P(A \cap B)$
- $\frac{P(A)}{P(B)}$
- $\frac{P(A\cap B)}{P(B)}$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$\frac{P(A\cap B)}{P(B)}$

2) The levels of a 4-ary PAM constellation are $S = \{-3\alpha, -\alpha, \alpha, 3\alpha\}$ with $P(\alpha) = P(-\alpha) = 2P(3\alpha) = 2P(-3\alpha)$. Let x_1, x_2 denote two symbols drawn independently from the constellation. The probability that $x_1 = x_2 = \alpha$ is *1 point*

- 2/3
- 1/9
- 1/3
- 1/6

No, the answer is incorrect.
Score: 0
Accepted Answers:
1/9

3) Consider a binary symmetric channel with $P(A_0) = 0.7$, $P(B_1|A_0) = P(B_0|A_1) = 0.2$, where A_i, B_j denote the events corresponding to transmitted and received symbols $i \in 0, 1$ at the transmitter and receiver respectively. Then, the aposteriori probability $P(A_0|B_1)$equals *1 point*

- 5/19
- 6/17
- 4/17
- 7/19

No, the answer is incorrect.
Score: 0
Accepted Answers:
7/19

4) Consider a binary symmetric channel with $P(A_1) = 0.8$, $P(B_0|A_0) = P(B_1|A_1) = 0.6$, where A_i, B_j denote the events corresponding to transmitted and received symbols $i \in 0, 1$ at the transmitter and receiver respectively. Then, the aposteriori probability $P(A_1|B_1)$equals *1 point*

- 4/9
- 6/7
- 5/13
- 7/15

No, the answer is incorrect.
Score: 0
Accepted Answers:
6/7

5) Consider a uniform quantizer with 512 quantization levels and maximum message amplitude 250. What is the approximate quantization noise power? *1 point*

- - 4.26 dB
- 0.72 dB
- - 7.21 dB
- - 10.81 dB

No, the answer is incorrect.
Score: 0
Accepted Answers:
- 10.81 dB

6) If two events A, B are mutually exclusive, then which of the following statements is always true *1 point*

- $P(A \cup B) = 0$
- $P(A \cap B) = 0$
- $P(A \cup B) = 1$
- $P(A \cap B) = 1$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$P(A \cap B) = 0$

7) The third axiom of probability states *1 point*

- $P(A) \leq 1$
- $P(A \cup B) = P(A) + P(B)$ if $A \cap B = \phi$
- $P(A \cap B) \geq P(A) + P(B)$ if A, B are independent
- $P(A) \geq 0$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$P(A \cup B) = P(A) + P(B)$ *if* $A \cap B = \phi$

8) If two events A, B are independent, then which of the following statements is always true *1 point*

- $P(A \cup B) = P(A)P(B)$
- $P(A \cup B) = 1$
- $P(A \cap B) = 0$
- $P(A \cap B) = P(A)P(B)$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$P(A \cap B) = P(A)P(B)$

9) $\frac{P(A\cap B)}{P(A|B)}$ equals *1 point*

- $P(A)$
- $\frac{P(A)}{P(B)}$
- $P(A)P(B)$
- $P(B)$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$P(B)$

10) For any two events A, B the quantity $P(A \cup B)$ always equals *1 point*

- $P(A) + P(B)$
- $P(A) + P(B) + P(A \cap B)$
- $P(A \cap B) - P(A) - P(B)$
- $P(A) + P(B) - P(A \cap B)$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$P(A) + P(B) - P(A \cap B)$