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reviewer2@nptel.iitm.ac.in ▼

Courses » Probability and Random Variables / Processes for Wireless Communications

Announcements Course Ask a Question Progress



Unit 3 - Random Variables, Probability Density Functions, Applications in Wireless Channels

Course outline

How to access the portal

Basics of Probability, Conditional Probability, MAP Principle

Random Variables, Probability Density Functions, Applications in Wireless Channels

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

Assignment 2

The due date for submitting this assignment has passed. **Due on 2017-02-07, 23:59 IST.**
As per our records you have not submitted this assignment.

1) Consider N mutually exclusive and exhaustive events $A_0, A_1, A_2, \dots, A_{N-1}$ and another event B . From Bayes' theorem, the probability $P(A_i|B)$ is, **1 point**

- $$\frac{P(B \cap A_i)}{\sum_{j=0}^{N-1} P(B \cap A_j)}$$
- $$\frac{P(B|A_i)}{\sum_{j=0}^{N-1} P(B \cap A_j)}$$
- $$\frac{P(B \cap A_i)P(A_i)}{\sum_{j=0}^{N-1} P(B|A_j)}$$
- $$\frac{P(B \cap A_i)}{\sum_{j=0}^{N-1} P(B \cap A_j)P(A_j)}$$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$$\frac{P(B \cap A_i)}{\sum_{j=0}^{N-1} P(B \cap A_j)}$$

1.2) Consider a binary "asymmetric" channel with $P(A_0) = 0.15$, $P(B_1|A_0) = 0.20$, $P(B_1|A_1) = 0.75$, **1 point** where A_i, B_i denote the events corresponding to transmitted and received symbols $i \in \{0, 1\}$ at the transmitter and receiver respectively. Then, $P(A_1), P(B_0|A_1)$ respectively are,

- 0.85, 0.80
- 0.15, 0.25
- 0.85, 0.25
- 0.15, 0.80

No, the answer is incorrect.

Score: 0

Accepted Answers:

0.85, 0.25

- Quiz :
Assignment 2
- Assignment-2
Solutions

**Basics of
Random
Processes,
Wireless Fading
Channel
Modeling**

**Gaussian
Random
Process, Noise,
Bit-Error and
Impact on
Wireless
Systems**

3) Consider a binary "asymmetric" channel with $P(A_0) = 0.15$, $P(B_1|A_0) = 0.20$, $P(B_1|A_1) = 0.75$. **1 point** where A_i , B_i denote the events corresponding to transmitted and received symbols $i \in \{0, 1\}$ at the transmitter and receiver respectively. Which of the following values correspond to a particular "likelihood" in this system

- 0.15
- 0.85
- 0.70
- 0.80

No, the answer is incorrect.

Score: 0

Accepted Answers:

0.80

4) Consider a binary "asymmetric" channel with $P(A_0) = 0.15$, $P(B_1|A_0) = 0.20$, $P(B_1|A_1) = 0.75$. **1 point** where A_i , B_i denote the events corresponding to transmitted and received symbols $i \in \{0, 1\}$ at the transmitter and receiver respectively. What is the a posteriori probability $P(A_0|B_0)$?

- 0.46
- 0.36
- 0.66
- 0.56

No, the answer is incorrect.

Score: 0

Accepted Answers:

0.36

5) Consider a binary "asymmetric" channel with $P(A_0) = 0.15$, $P(B_1|A_0) = 0.20$, $P(B_1|A_1) = 0.75$. **1 point** where A_i , B_i denote the events corresponding to transmitted and received symbols $i \in \{0, 1\}$ at the transmitter and receiver respectively. What are the MAP estimates corresponding to the observations 0,1 respectively at the receiver,

- 0, 0
- 0, 1
- 1, 0
- 1, 1

No, the answer is incorrect.

Score: 0

Accepted Answers:

1, 1

6) Consider a binary "asymmetric" channel with $P(A_0) = 0.15$, $P(B_1|A_0) = 0.20$, $P(B_1|A_1) = 0.75$. **1 point** where A_i , B_i denote the events corresponding to transmitted and received symbols $i \in \{0, 1\}$ at the transmitter and receiver respectively. What is the probability of error for the MAP receiver?

- 0.15
- 0.24
- 0.20
- 0.28

No, the answer is incorrect.

Score: 0

Accepted Answers:

0.15

7) Consider a binary "asymmetric" channel with $P(A_0) = 0.15$, $P(B_1|A_0) = 0.20$, $P(B_1|A_1) = 0.75$. **1 point** where A_i , B_i denote the events corresponding to transmitted and received symbols $i \in \{0, 1\}$ at the transmitter and receiver respectively. What are the ML estimates corresponding to the observations 0,1 respectively at the receiver?



- 0,0
 0,1
 1,0
 1,1

No, the answer is incorrect.

Score: 0

Accepted Answers:

0,1

8) Consider the probability density function $f_X(x) = Kx^2 \exp(-x^2)$ for $-\infty \leq x \leq \infty$. 1 point
The value of constant K is,

- 2
 0.5
 $\frac{2}{\sqrt{\pi}}$
 $\frac{1}{\sqrt{2\pi}}$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$\frac{2}{\sqrt{\pi}}$

9) Consider the probability density function $f_X(x) = Kx^2 \exp(-x^2)$ for $-\infty \leq x \leq \infty$. The mean of the random variable is 1 point

- 1
 0.5
 $\sqrt{\frac{2}{\pi}}$
 0

No, the answer is incorrect.

Score: 0

Accepted Answers:

0

10) Consider the probability density function $f_X(x) = Kx^2 \exp(-x^2)$ for $-\infty \leq x \leq \infty$. 1 point
The variance of the random variable is,

- 1.5
 2
 0.5
 3

No, the answer is incorrect.

Score: 0

Accepted Answers:

1.5



Previous Page

End

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