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Courses » Probability and Random Variables / Processes for Wireless Communications

Announcements Course Ask a Question Progress

Unit 2 - Basics of Probability, Conditional Probability, MAP Principle



Course outline

How to access the portal

Basics of Probability, Conditional Probability, MAP Principle

- Basics - Sample Space and Events
- Axioms of Probability
- Conditional Probability - Mary-PAM Example
- Independent Events - Mary-PAM Example
- Independent Events - Block Transmission Example
- Independent Events - Multiantenna Fading Example
- Quiz : Assignment 1
- Assignment-1 Solutions

Random Variables, Probability Density Functions, Applications in Wireless Channels

Basics of Random Processes,

Assignment 1

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) Q1. The first axiom of probability states

1 point

$$P(A) \leq 1$$

$$P(A) \geq 0$$

$$P(A \cup B) = P(A) + P(B)$$

$$P(A|B) = P(A \cap B)/P(B)$$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$$P(A) \geq 0$$

2) Q2. For two events A, B , it is always true that

1 point

$$P(A) + P(B) \geq 1$$

$$P(A) + P(B) \leq 1$$

$$P(A) - P(A \cup B) \leq P(A \cap B)$$

$$P(A|B) \leq P(A)$$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$$P(A) - P(A \cup B) \leq P(A \cap B)$$

3) Q3. The levels of a M -ary PAM constellation with $M = 8$ are $\{-7\alpha, -5\alpha, -3\alpha, -\alpha, \alpha, 3\alpha, 5\alpha, 7\alpha\}$. The probabilities of these symbols are related as $P((2i - 1)\alpha) = 2P((2i - 3)\alpha)$, for $-2 \leq i \leq 4$. The probability $P(5\alpha)$ is,

1 point

 1/8

 1/16

 64/255

 1/255

Wireless Fading
Channel
Modeling

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

No, the answer is incorrect.

Score: 0

Accepted Answers:

64/255

4) Q4. The levels of a M -ary PAM constellation with $M = 8$ are $\{-7\alpha, -5\alpha, -3\alpha, -\alpha, \alpha, 3\alpha, 5\alpha, 7\alpha\}$. The probabilities of these symbols are related as $P((2i - 1)\alpha) = 2P((2i - 3)\alpha)$, for $-2 \leq i \leq 4$. Consider two events $A = \{-7\alpha, -3\alpha, \alpha\}$, $B = \{-5\alpha, -3\alpha, 7\alpha\}$. The probability $P(A \cup B)$ is,

1 point

- 63/255
 3/8
 1/127
 151/255

No, the answer is incorrect.

Score: 0

Accepted Answers:

151/255

5) Q5. The levels of a M -ary PAM constellation with $M = 8$ are $\{-7\alpha, -5\alpha, -3\alpha, -\alpha, \alpha, 3\alpha, 5\alpha, 7\alpha\}$. The probabilities of these symbols are related as $P((2i - 1)\alpha) = 2P((2i - 3)\alpha)$, for $-2 \leq i \leq 4$. Consider two events $A = \{-3\alpha, -\alpha, \alpha, 3\alpha\}$, $B = \{-7\alpha, -3\alpha, \alpha, 5\alpha\}$. The probability $P(A|B)$ is,

1 point

- 4/17
 85/255
 22/255
 19/127

No, the answer is incorrect.

Score: 0

Accepted Answers:

4/17

6) Q6. Two events A , B are independent if and only if,

1 point

- $P(A \cup B) = P(A) + P(B) - P(A)P(B)$

 $P(A|B) = P(B)$

 $P(A \cap B)/P(A) = P(A|B)$
 All of the above

No, the answer is incorrect.

Score: 0

Accepted Answers:

$P(A \cup B) = P(A) + P(B) - P(A)P(B)$

7) Q7. The levels of a M -ary PAM constellation with $M = 8$ are $\{-7\alpha, -5\alpha, -3\alpha, -\alpha, \alpha, 3\alpha, 5\alpha, 7\alpha\}$. The probabilities of these symbols are related as $P((2i - 1)\alpha) = 2P((2i - 3)\alpha)$, for $-2 \leq i \leq 4$. Let x_1, x_2 denote the symbols at time instants 1, 2 respectively. Consider two events $A = \{-3\alpha, -\alpha, \alpha, 3\alpha\}$, $B = \{-7\alpha, -3\alpha, \alpha, 5\alpha\}$. If the symbols at different time instants are *independent*, then probability $P((x_1 \in A) \cap (x_2 \in B))$ is,

1 point

- 3/255
 4/51
 4/85
 33/255

No, the answer is incorrect.

Score: 0

Accepted Answers:



4/51

8) Q8. The levels of a M -ary PAM constellation with $M = 8$ are $\{-7\alpha, -5\alpha, -3\alpha, -\alpha, \alpha, 3\alpha, 5\alpha, 7\alpha\}$. The probabilities of these symbols are related as $P((2i - 1)\alpha) = 2P((2i - 3)\alpha)$, for $-2 \leq i \leq 4$. Let x_1, x_2 denote the symbols at time instants 1, 2 respectively. Consider two events $A = \{-3\alpha, -\alpha, \alpha, 3\alpha\}$, $B = \{-7\alpha, -3\alpha, \alpha, 5\alpha\}$. If the symbols at different time instants are *independent*, then probability $P((x_1 \in A) \cup (x_2 \in B))$ is,

1 point

- 151/255
- 3/255
- 17/127
- 25/51

No, the answer is incorrect.**Score: 0****Accepted Answers:**

25/51

9) Q9. The levels of a M -ary PAM constellation with $M = 8$ are $\{-7\alpha, -5\alpha, -3\alpha, -\alpha, \alpha, 3\alpha, 5\alpha, 7\alpha\}$. The probabilities of these symbols are related as $P((2i - 1)\alpha) = 2P((2i - 3)\alpha)$, for $-2 \leq i \leq 4$. Let x_1, x_2 denote the symbols at time instants 1, 2 respectively. Consider two events $A = \{-5\alpha, -\alpha, \alpha, 5\alpha\}$, $B = \{-7\alpha, -3\alpha, 3\alpha, 7\alpha\}$. If the symbols at different time instants are *independent*, then probability $P((x_1 \in A)|(x_2 \in A \cup B))$ is,

1 point

- 2/17
- 4/17
- 6/17
- 8/17

No, the answer is incorrect.**Score: 0****Accepted Answers:**

6/17

10) Q10. The levels of a M -ary PAM constellation with $M = 8$ are $\{-7\alpha, -5\alpha, -3\alpha, -\alpha, \alpha, 3\alpha, 5\alpha, 7\alpha\}$. The probabilities of these symbols are related as $P((2i - 1)\alpha) = 2P((2i - 3)\alpha)$, for $-2 \leq i \leq 4$. The symbols at different time instants are *independent*. Also, for each symbol x , the probability of symbol error e is $P(e|x) = N_x/10$, where N_x is the number of neighbors of x . For example, $-3\alpha, \alpha$ are the neighbors of $-\alpha$. What is the average probability of symbol error?

1 point

- 67/850
- 87/850
- 107/850
- 127/850

No, the answer is incorrect.**Score: 0****Accepted Answers:**

127/850




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