

Unit 13 - Week 12

Course outline

How to access the portal

Overview of Cellular Evolution and Wireless Technologies

Wireless Propagation and Cellular Concepts

Cellular System Design, Capacity, Handoff, and Outage

Week 4 - Multipath Fading Environment

Week 5 - BER Performance in Fading Channels

Week 6 - Wide Sense Stationary Uncorrelated Scattering (WSSUS) Channel Model

Week 7 - Computer simulation of Rayleigh fading, Antenna Diversity

Week 8 - Fading Channels - Diversity and Capacity

Week 9 - Capacity and Introduction to CDMA

Week 10 - Introduction to CDMA

Week 11 - CDMA Receivers

Week 12

 Lecture 52

 Lecture 53

 Lecture 54

 Lecture 55

 Feedback for Week 12

 lec52_notes

 lec53_notes

 lec54_notes

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 Assignment 12 Solutions

 Quiz : Assignment 12

Text Transcription

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Assignment 12

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

Due on 2019-10-23, 23:59 IST.

1) Which of the following is/are the benefit(s) of a MIMO system? **1 point**

- Increased capacity
 Diversity benefit
 Both (a) and (b)
 None of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
Both (a) and (b)

2) Consider a MIMO system in which the channel transfer matrix (H) is known. Which of the following methods can be used if H is not a square matrix? **1 point**

- Matrix inversion
 Singular value decomposition
 Matrix conjugate
 Matrix transpose

No, the answer is incorrect.
Score: 0

Accepted Answers:
Singular value decomposition

3) Which of the following is/are the assumption(s) made in a MIMO system? **1 point**

- The elements of channel transfer matrix (H) are zero mean complex Gaussian values
 The noise elements are complex additive white Gaussian with zero mean
 The transmitted signal (X) elements are zero mean complex Gaussian values
 All of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
All of the above

4) Which of the following is/are true regarding the power allocation in a MIMO system? **1 point**

- Channels with better SNR get higher power allocation
 Channels with poor SNR get higher power allocation
 Channel state information at the transmitter is required for optimum power allocation
 Both (a) and (c)

No, the answer is incorrect.
Score: 0

Accepted Answers:
Both (a) and (c)

5) What is the best strategy for power allocation if all the channels have poor SNR? **1 point**

- Allocate all the power to the channel with the best SNR and zero power to the other channels
 Allocate equal power to all the channels
 Both (a) and (b)
 None of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
Allocate all the power to the channel with the best SNR and zero power to the other channels

6) Which is the relation between Capacity and Mutual Information of a channel? **1 point**

- Capacity is always \geq MI
 Capacity is always \leq MI
 They are one and the same
 None of these

No, the answer is incorrect.
Score: 0

Accepted Answers:
Capacity is always \geq MI

7) Consider a 16-QAM transmitter where all the symbols are equi-likely. What is the Entropy of the source in terms of number of bits per channel use? **1 point**

- 0.25
 8
 0.125
 4

No, the answer is incorrect.
Score: 0

Accepted Answers:
4

8) What is the entropy in the above problem, if four of the 16-QAM symbols are transmitted twice as frequently as the other two symbols? **1 point**

- 3.92
 1.467
 4
 0.548

No, the answer is incorrect.
Score: 0

Accepted Answers:
3.92

9) What is the entropy of a variable with Gaussian distribution with mean μ and Variance? **1 point**

- $\mu + \log_2(\pi e \sigma^2)$
 $0.5 * \log_2(2\pi e \sigma^2)$
 $0.5 * \log_2[\pi e(\sigma + \mu)^2]$
 None of these

No, the answer is incorrect.
Score: 0

Accepted Answers:
 $0.5 * \log_2(2\pi e \sigma^2)$

10) Which of the following is NOT true about HH^* , where H is the channel transition matrix, '*' is the Hermitian operator. **1 point**

- HH^* is a square matrix
 HH^* is positive semi-definite
 $HH^* = H^*H$
 $HH^* = (HH^*)^*$

No, the answer is incorrect.
Score: 0

Accepted Answers:
 $HH^* = H^*H$