

# Unit 12 - Week 11 - CDMA Receivers

## 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

#### Rake Receiver for multipath channels

#### Multiuser environment

#### CDMA system Capacity

#### CDMA Multiuser Detectors – Part 1

#### CDMA Multiuser Detectors – Part 2

#### lec47\_notes

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#### Assignment 11 Solutions

#### Quiz : Assignment 11

### Week 12

### Text Transcription

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## Assignment 11

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

**Due on 2019-10-16, 23:59 IST.**

- 1) Consider a two user CDMA system with imperfect power control. Let  $|\alpha_1| = 0.4$  and  $|\alpha_2| = 2 \cdot \frac{E_b}{N_0} = 8dB$  and  $Q = 64$ . The Degradation factor  $Dg_1$  and  $Dg_2$  for user1 and user2 are respectively **1 point**
- 0.068 dB , 1.444 dB  
 -0.068 dB , -1.444 dB  
 1.444 dB, 0.068 dB  
 -1.444 dB, -0.068 dB

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
-1.444 dB, -0.068 dB

- 2) For the question 1, what is the SINR1 and SINR2 for the user1 and user2 respectively? **1 point**
- 1.403 dB, 15.95 dB  
 1.403 dB , -15.95 dB  
 -15.95 dB , 1.403 dB  
 15.95 dB, -1.403 dB

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
-1.403 dB, 15.95 dB

- 3) For the system in question 2, if we decrease the power of transmission of user 2, which of the following statements is correct? **1 point**
- SINR<sub>1</sub> will remain unchanged, SINR<sub>2</sub> will increase  
 SINR<sub>1</sub> will decrease, SINR<sub>2</sub> will increase  
 SINR<sub>1</sub> will decrease, SINR<sub>2</sub> will increase  
 SINR<sub>1</sub> will increase, SINR<sub>2</sub> will decrease

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
SINR<sub>1</sub> will increase, SINR<sub>2</sub> will decrease

- 4) Consider a multi cell CDMA system with  $I_{o,c} = 0.7 I_i, c$ . The length of spreading sequence used is  $Q = 64$ . The ratio of interference power to Noise Power  $\frac{I_o}{N_0}$  is 4 (not dB) and the voice activity factor is 0.4. Let the number of users in a typical cell be  $K = 120$ . What is the SINR of the system? Assume perfect power control with  $|a| = 1$  for all users. **1 point**
- 2.02 dB  
 -2.02 dB  
 0.63 dB  
 -0.63 dB

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
-2.02 dB

- 5) For a CDMA system, the target SINR is 10 dB and  $I_{o,c} = 0.6 I_i, c$ . The Voice Activity Factor is 0.4 and the length of the spreading sequence is  $Q = 64$ . What is the pole capacity of the system? **1 point**
- 12  
 16  
 10  
 8

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
10

- 6) For the system described in the previous question if the Total Noise rise due to interference is 4.77 dB, what is the practical capacity of the system? **1 point**
- 4  
 3  
 10  
 12

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
3

- 7) Which of the following could be a potential problem with the de-correlating receiver? **1 point**
- Multiuser interference  
 Near Far problem  
 Noise enhancement  
 None of the above

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
Noise enhancement

- 8) What can be a possible disadvantage of cell breathing under the assumption that the radius increases beyond the nominal value? **1 point**
- Reduced coverage area  
 Increased interference from neighboring base stations  
 Both (a) and (b)  
 None of the above

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
Increased interference from neighboring base stations

- 9) For the above question about cell breathing, what is a possible drawback if the radius reduces below the nominal value? **1 point**
- Creation of regions with no coverage  
 Increased interference  
 Both (a) and (b)  
 None of the above

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
Creation of regions with no coverage

- 10) In Gold and Kasami sequences, mutual orthogonality between 2 sequences should be as close to 0 as possible. This helps to prevent which of the following? **1 point**
- Multiuser interference  
 Multipath interference  
 Both (a) and (b)  
 None of the above

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
Multiuser interference