

Unit 11 - Week 10 - Introduction to CDMA

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

Properties of Spreading Sequences

Properties of Spreading Sequences – Part 2

Introduction to CDMA

Features of cdma2000 and WCDMA

lec43-44_notes

Feedback for week 10

lec45_notes

lec46_notes

Assignment 10 Solution

Quiz : Assignment 10

Week 11 - CDMA Receivers

Week 12

Text Transcription

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Assignment 10

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

Due on 2019-10-09, 23:59 IST.

- 1) In DS-SS with length of spreading sequence Q, which of the following is true regarding the frequency response of the DS-SS pulse shaping signal? **1 point**
- Bandwidth gets scaled by Q
 Magnitude gets scaled by 1/Q
 Both a) and b)
 None of the above
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
Bandwidth gets scaled by Q
- 2) What is the bandwidth of a DS-SS system with a spreading factor Q = 12 and $T_s = 4\mu\text{s}$? **1 point**
- 2.5MHz
 5MHz
 3MHz
 6MHz
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
3MHz
- 3) What is the symbol duration for a DS-SS system with a spreading factor Q = 10 and Chip Duration (T_c) = $40\mu\text{s}$? **1 point**
- 4 μs
 576 μs
 200 μs
 400 μs
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
400 μs
- 4) Which of the following is an advantage of DS-SS? **1 point**
- It improves the SNR in an AWGN environment
 It reduces the effect of Interference by introducing processing gain
 It reduces the effect of multipath
 All the above are advantages of DS-SS system
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
It reduces the effect of Interference by introducing processing gain
- 5) In the lectures, two possible implementations of DS-SS matched filter based receivers were discussed. Let the two implementations be denoted by R_1 and R_2 . Which of the following statements is **FALSE**? **1 point**
- R_1 is better than R_2 because it is less complex.
 R_1 is better than R_2 since the matched filter doesn't need to be changed for every symbol
 R_1 and R_2 are equivalent
 Both a) and b)
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
Both a) and b)
- 6) Which of the following is a primitive polynomial? **1 point**
- $1+x+x^3$
 $1+x^2+x^3$
 $1+x^3+x^4$
 All of the above
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
All of the above
- 7) Consider m-sequences with $m = 4$. What will be the number of 1s and 0s respectively, in the sequences? **1 point**
- 8 and 7
 15 and 16
 7 and 8
 16 and 15
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
8 and 7
- 8) What will be the result of autocorrelation (as defined in the lecture) of an m-sequence with itself (i.e. with zero lag)? **1 point**
- 1
 -0.25
 1
 0.25
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
1
- 9) Consider m-sequences with $m=4$. Assume that if possible, all of the 15 different sequences are assigned to 15 different users. What can be a potential problem in doing so in a multipath environment? **1 point**
- There would be no way of distinguishing between signals which are multipaths of the same user from the signals of the other users
 It is impossible to assign 15 sequences to 15 different users
 Both a) and b)
 None of the above
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
There would be no way of distinguishing between signals which are multipaths of the same user from the signals of the other users
- 10) As discussed in the lecture assume a WH sequence of length = 4 (say (4,1)) and one of its children sequences of length = 8 (say (8,3)). Would there be a problem in assigning these sequences to different users and why? **1 point**
- Yes, because the 2 sequences are orthogonal
 Yes, because the 2 sequences are not orthogonal and have perfect correlation
 No, because the 2 sequences are orthogonal
 None of the above
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
Yes, because the 2 sequences are not orthogonal and have perfect correlation
- 11) Assume 2 random sequences, X and Y, each of length Q. What would be the cross correlation between these sequences when there is no lag, i.e. $R_{XY}[0] = ?$ (Hint: Refer to the lectures where the random sequences and their properties were discussed) **1 point**
- 0
 1
 1/Q
 Q
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
1/Q
- 12) Let us look at the sinc to rect conversions. We are given a pulse $g(t) = \frac{1}{\sqrt{T}} \text{rect}\left(\frac{t - \frac{T}{2}}{T}\right)$. The Fourier Transform of $g(t)$, i.e., $G(f)$ is? **1 point**
- $\sqrt{T} \text{sinc}(fT)e^{-\pi fT}$
 $\frac{1}{\sqrt{T}} \text{sinc}(fT)e^{-\pi fT}$
 $\sqrt{T} \text{sinc}(fT)e^{-\frac{\pi fT}{2}}$
 $\frac{1}{\sqrt{T}} \text{sinc}(f)e^{-\pi fT}$
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
 $\sqrt{T} \text{sinc}(fT)e^{-\pi fT}$
- 13) 13) In the above question, the first zero crossing of $|G(f)|$ i.e. the magnitude of $G(f)$ occurs at? **1 point**
- 1/T
 2/T
 1/2T
 0
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
1/T