

Unit 5 - Wireless Channel Characterization - Delay Spread and Doppler

Course outline

How to Access the Portal ?

Introduction to Wireless Systems

Performance in Fading wireless channels

Multiple Antenna Wireless Systems and Diversity

Wireless Channel Characterization - Delay Spread and Doppler

 Max Delay Spread

 RMS Delay Spread

 Delay Spread and Inter Symbol Interference

 Coherence Bandwidth of Wireless Channel

 Mobility and Doppler Effect in Wireless Channels

 Impact of Doppler Effect on Wireless Channel

 Quiz : Assignment-4

 Feedback for Week-4

 Solution-4

Principles of CDMA Wireless Communication

Principles of CDMA and MIMO Wireless Communication

Principles of MIMO Wireless Communication (Continued)

Principles of OFDM Wireless Communication

Text Transcription

Unit-0

Assignment-4

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

Due on 2019-09-25, 23:59 IST.

1) Consider an $L = 5$ component multipath wireless channel with components arriving at $0 \mu s, 2 \mu s, 3 \mu s, 6 \mu s, 8 \mu s$ and respective powers of components as $-10 \text{ dB}, -20 \text{ dB}, 0 \text{ dB}, -10 \text{ dB}, -20 \text{ dB}$. What are the Maximum and RMS delay spreads of the wireless channel? **1 point**

- $8 \mu s, 3.032 \mu s$
 $6 \mu s, 1.299 \mu s$
 $6 \mu s, 3.032 \mu s$
 $8 \mu s, 1.299 \mu s$

No, the answer is incorrect.
Score: 0

Accepted Answers:
 $8 \mu s, 1.299 \mu s$

2) When symbol time is much smaller than the delay spread, the resulting wireless channel is known as **1 point**

- Flat Fading
 Frequency Selective Fading
 Fast Fading
 Rayleigh Fading

No, the answer is incorrect.
Score: 0

Accepted Answers:
Frequency Selective Fading

3) Consider a channel with coherence bandwidth = 700 KHz . The delay spread of this channel is approximately equal to **1 point**

- $1.43 \mu s$
 $0.714 \mu s$
 $2.86 \mu s$
 $1.86 \mu s$

No, the answer is incorrect.
Score: 0

Accepted Answers:
 $1.43 \mu s$

4) Frequency selective distortion occurs in a wireless channel when **1 point**

- Delay spread is smaller than coherence time
 Signal Bandwidth is lower than coherence bandwidth
 Coherence bandwidth is lower than signal bandwidth
 Coherence time is smaller than symbol time

No, the answer is incorrect.
Score: 0

Accepted Answers:
Coherence bandwidth is lower than signal bandwidth

5) Frequency selective fading in a wireless channel leads to **1 point**

- Multipath Interference
 Doppler Shift
 Inter Symbol Interference
 Time Varying Channel

No, the answer is incorrect.
Score: 0

Accepted Answers:
Inter Symbol Interference

6) Consider a mobile user moving with velocity 90 kmph at carrier frequency 2.5 GHz and an angle of 45° . The coherence time of the channel is **1 point**

- 3.38 ms
 1.69 ms
 0.85 ms
 2.1 ms

No, the answer is incorrect.
Score: 0

Accepted Answers:
 1.69 ms

7) The Doppler spread of a wireless channel arises due to **1 point**

- Mobility
 Multipath Propagation
 High Transmit Power
 Large Propagation Distance

No, the answer is incorrect.
Score: 0

Accepted Answers:
Mobility

8) Consider an $L = 4$ component multipath wireless channel with components arriving at $0 \mu s, 1 \mu s, 3 \mu s$ and $5 \mu s$ and respective powers of components as $-10 \text{ dB}, -20 \text{ dB}, 0 \text{ dB}$ and -10 dB respectively. What is the RMS delay spread of the wireless channel **1 point**

- $0.85 \mu s$
 $1.05 \mu s$
 $0.95 \mu s$
 $1.15 \mu s$

No, the answer is incorrect.
Score: 0

Accepted Answers:
 $1.05 \mu s$

9) Coherence Bandwidth is approximately equal to **1 point**

- $\frac{1}{T_d}$, where T_d is the delay spread
 $\frac{1}{P}$, where P is the transmit power
 Bandwidth B allocated for communication
 $\frac{1}{(2 \times f_d)}$, where f_d is the Doppler spread

No, the answer is incorrect.
Score: 0

Accepted Answers:
 $\frac{1}{T_d}$, where T_d is the delay spread

10) Coherence Time is approximately equal to **1 point**

- $\frac{1}{(2 \times T_d)}$, where T_d is the delay spread
 $\frac{1}{P}$, where P is the transmit power
 Bandwidth B allocated for communication
 $\frac{1}{(4 \times f_d)}$, where f_d is the Doppler spread

No, the answer is incorrect.
Score: 0

Accepted Answers:
 $\frac{1}{(4 \times f_d)}$, where f_d is the Doppler spread