

Unit 3 - Performance in Fading wireless channels

Course outline

How to Access the Portal ?

Introduction to Wireless Systems

Performance in Fading wireless channels

- Bit Error Rate of Rayleigh Fading Wireless Channel
- Exact BER Expression for Rayleigh Fading Wireless Channel
- Deep Fade Analysis of Wireless Communication
- Principle of Diversity
- Multiple Antenna Diversity
- Maximal-Ratio Combining

Quiz : Assignment-2

- Assignment-2 Solution
- Feedback for week-2

Multiple Antenna Wireless Systems and Diversity

Wireless Channel Characterization - Delay Spread and Doppler

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-2

The due date for submitting this assignment has passed.

Due on 2019-09-11, 23:59 IST.

As per our records you have not submitted this assignment.

1) The poor error rate of a fading wireless communication channel can be intuitively explained by 1 point

- Higher bandwidth
- Time selectivity
- Frequency selectivity
- Deep fade event

No, the answer is incorrect.
Score: 0

Accepted Answers:
Deep fade event

2) At $SNR = 35 \text{ dB}$, deep fade occurs when the amplitude a of the Rayleigh fading channel is lower than the threshold 1 point

- 0.0125
- 0.0003
- 0.0178
- 0.0356

No, the answer is incorrect.
Score: 0

Accepted Answers:
0.0178

3) For equal noise power, the difference in transmit powers required to achieve $BER = 5 \times 10^{-10}$ in a wireless and wireline systems is approximately, 1 point

- 74 dB
- 64 dB
- 84 dB
- 44 dB

No, the answer is incorrect.
Score: 0

Accepted Answers:
74 dB

4) The BER of a single antenna Rayleigh fading wireless channel of average power gain 2, i.e., $E\{|h|^2\} = 2$ where h is the fading channel coefficient, as a function of SNR is given as 1 point

- $\frac{1}{2} \left(1 - \sqrt{\frac{SNR}{1+SNR}} \right)$
- $\frac{1}{2} \left(1 - \sqrt{\frac{SNR}{2+SNR}} \right)$
- $\frac{1}{2} \left(1 - \sqrt{\frac{SNR}{3+SNR}} \right)$
- $\frac{1}{2} \left(1 - \sqrt{\frac{SNR}{4+SNR}} \right)$

No, the answer is incorrect.
Score: 0

Accepted Answers:
 $\frac{1}{2} \left(1 - \sqrt{\frac{SNR}{1+SNR}} \right)$

5) What is the approximate dB SNR required to achieve BER of 5×10^{-10} in an AWGN channel 1 point

- 10.08 dB
- 13.08 dB
- 15.08 dB
- 17.08 dB

No, the answer is incorrect.
Score: 0

Accepted Answers:
15.08 dB

6) The exact BER of an AWGN channel $y(k) = 2x(k) + n(k)$ for a given transmit $SNR = \frac{P}{\sigma^2}$ is 1 point

- $Q(\sqrt{SNR})$
- $Q(\sqrt{2 SNR})$
- $Q(\sqrt{3 SNR})$
- $Q(\sqrt{4 SNR})$

No, the answer is incorrect.
Score: 0

Accepted Answers:
 $Q(\sqrt{4 SNR})$

7) At $SNR = 35 \text{ dB}$, deep fade occurs when the amplitude a of the Rayleigh fading channel is 1 point

- < 0.017
- < 0.027
- < 0.037
- < 0.047

No, the answer is incorrect.
Score: 0

Accepted Answers:
 < 0.017

8) The approximate BER at $SNR = 65 \text{ dB}$, in a Rayleigh fading wireless channel is 1 point

- 1.58×10^{-6}
- 1.58×10^{-7}
- 1.58×10^{-8}
- 1.58×10^{-9}

No, the answer is incorrect.
Score: 0

Accepted Answers:
 1.58×10^{-7}

9) For a given BER , the dB SNR required in a Rayleigh fading wireless channel of average power gain $E\{|h|^2\} = \kappa$ is given as 1 point

- $10 \log_{10} \frac{2(1-2BER)^2}{1-(1-2BER)^2}$
- $10 \log_{10} \frac{2(1-2BER)^2}{\kappa(1-(1-2BER)^2)}$
- $10 \log_{10} \frac{2(1-BER)^2}{2\kappa(1-(1-BER)^2)}$
- $10 \log_{10} \frac{2(1-BER)^2}{\kappa(1-(1-BER)^2)}$

No, the answer is incorrect.
Score: 0

Accepted Answers:
 $10 \log_{10} \frac{2(1-2BER)^2}{\kappa(1-(1-2BER)^2)}$

10) In a single antenna Rayleigh fading wireless channel, the probability of deep fade is proportional to 1 point

- $\frac{1}{\sqrt{SNR}}$
- SNR
- \sqrt{SNR}
- $\frac{1}{SNR}$

No, the answer is incorrect.
Score: 0

Accepted Answers:
 $\frac{1}{SNR}$