



ECE440: ADVANCED WIRELESS COMMUNICATION SYSTEM

Set B

CA: 3

M.Marks:30

Each Question Carries 5 marks.

Q-1 Discuss Downlink Channel Capacity CSIR ONLY for Fast fading channel?

Q-2 Draw and Explain the model for MIMO system with mathematical analysis.

Q-3 Discuss Time sharing strategy to calculate the optimal data rate between two users.

Q-4 What are the Impact of Multiple Users in Fast fading channel, Discuss it with proper example.

Q-5 Explain the concept of IFFT/FFT for OFDM, In OFDM system if number of Tabs $L= 25$ and $N = 256$ subcarriers, $SNR = 30$ dB, calculate BER?

Q-6 Discuss Superposition coding principle for calculate the optimal data rate for two users and compare it with conventional CDMA.

Maximum Likelihood

$$\Lambda(y) = \frac{f(y|x_A)}{f(y|x_B)} \stackrel{x_A}{\geq} \stackrel{x_B}{\leq} 0$$

$$= \frac{a^2 [(y[0])^2 - (y[1])^2]}{(a^2 + N_0) N_0}$$

$$\underline{P_e} = P[y[1]^2 > y[0]^2 | x_A]$$

$$= \left[2 + \frac{a^2}{N_0} \right]^{-1}$$

$$SNR = \frac{a^2}{2N_0}$$

$$P_e = [2 + SNR]^{-1}$$

$$P_e = \frac{1}{2[1 + SNR]}$$

Non coherent
Fading
✓

Conclusion

$$P_e = 10^{-3}$$

$$\Rightarrow \underline{SNR} \approx \underline{27 \text{ dB}}$$

$$\frac{1}{10} = \frac{1}{2[1 + SNR]}$$

$$\Rightarrow 10 = 2[1 + SNR]$$

$$\Rightarrow 5 = 1 + SNR$$

$$\Rightarrow SNR = 4$$

$$\Rightarrow 6 \text{ dB}$$

a_0