الجمهورية الجزائرية الديمقراطية الشعبية
People's Democratic Republic of Algeria
وزارة التعليم العالي والبحث العلمي
Ministry of Higher Education and Scientific Research
جامعة الشهيد حمّه لخضر - الوادي
University Echahid Hamma Lakhdar, El-Oued

Technology Faculty
Department of Electrical Engineering
Speciality: Telecommunications

كلية التكنولوجيا
قسم الهندسة الكهربائية
إختصاص: اتصالات سلكية ولا سلكية

Analog Communications

Training Exercises 1

Exercise 1 :

Convert the following power quantities to their correspondences in dB or dBm:
1k watt; 10kwatt; 10mwatt

Results: 30dB, 40dB, 10dBm

Exercise 2 :

Calculate the ratio between the power of the signal Ps and that of the noise P_b to get a signal-to-noise ratio SNR = 3dB.
Same question for: (SNR=-3dB) ; (SNR=0dB), (SNR=10dB), (SNR=20dB).

Results: $P_s=2\ P_b$, $P_s=0.5\ P_b$, $P_s= P_b$, $P_s=10\ P_b$, $P_s=100\ P_b$.

Exercise 3 :

Calculate the theoretical capacity **C** (the maximum data rate) for a signal with a channel whose bandwidth **W** is 12 MHz and the signal-to-noise ratio **SNR** is 30 dB.
Same question for: (W=2 MHz and SNR=12dB); (W=10 kHz and SNR=9dB); (W=3 kHz and SNR=100watt).

Result: 119 Mbps

Exercise 4 :

Calculate the Signal/Noise Ratio (SNR) in decibel for a transmission line (channel) with a maximum data rate of 100Kbit /s and a bandwidth of 20kHz?

Same question for: (C=30Kbits/s and W=100KHz); (C=2Mbits/s and W=5MHz).

Result: SNR=14.9dB

Exercise 5 :
Calculate in decibel the power of a signal transmitted over a channel whose a bandwidth of 40 kHz and with maximum data rate of 40kbit/s, knowing that the power of the noise is 5dB.
Same question for: (C=1Kbits/s and W=500Hz); (C=1Mbits/s and W=1kHz).

Result: P_s=5dB.