Telecom exercices

Ex 1

1) 8 MHz 1 mot en 256 niveaux -> 8 bit

débit binaire

D = nb signal x nb de bit x fréquence d'échantillonage =

$1 \times 8 \times 8 \cdot 10^6 = 64 \cdot 10^6$ b/s $= 64$ Mb/s

2) $D = 1 \cdot 4 \cdot 8\, 10^6 = 32$ Mb/s

Ex2

1) 450 px * 500 px · 5 · 30 $= 3375 \cdot 10^4 = 34 \cdot 10^6$ b/s $= 34$ Mb/s

long haut prof fps

2) $C = B_p \cdot lb(1 + SNR) = 10 \cdot 10^9 \cdot lb(1 + 15) = 10 \cdot 10^9 \cdot 4 = 40$ Gb/s

$SNR_{dB} = 35$ $SNR_{lin} = 10 \log(35) \simeq 15$

Ex3

$C = B_p \cdot lb(1 + SNR) \Leftrightarrow 2^{\left(\frac{C}{B_p}\right)} - 1 = SNR \Rightarrow 2^{\frac{20 \cdot 10^6}{3 \cdot 10^6}} - 1 = 100,59$

$SNR_{dB} = 10 \log(SNR) = 20,02$ dB

Ex 4 $22 \cdot 10^3$ Hz 16 bits 2 can

1) $22 \cdot 10^3 \cdot 16 \cdot 2 \cdot 60 = 42240 \cdot 10^3 = 42 \cdot 10^6$ b $= 42$ Mb

2) $42 \cdot 2 = 84$ Mb

3) $SNR_{dB} = 25$ dB 45 min video

$SNR_{lin} = 10 \cdot \log(216) = 77$

$C = 22 \cdot 10^3 \cdot lb(1+77) = 138 \cdot 10^3$ b/s $= 138$ kb/s

Sur 32 bit: 84 Mb $\cdot 45 \cdot 60 = 216 \cdot 10^3 = 216$ kb

$$\frac{216 \text{ kb}}{138 \text{ kb/s}} = 1{,}6 \text{ s}$$