

Sistemas de transmisión digitales y síncronos

Parte I

Objetivos/requisitos: R (bps) y Pe

Recursos: Potencia, ancho de banda, eficiencia espectral

Canales:

$$r(t) = C s(t) + n(t)$$

$$r(t) = C(t) * s(t) + n(t)$$

$$r(t) = C(t, \tau) * s(t) + n(t)$$

Balance de enlace
y cobertura

ISI

Desvanecimiento y



Transición

Modelos:

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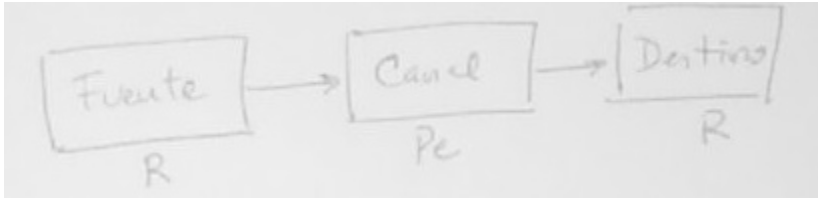
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KAYUS

Digital (Wanso)

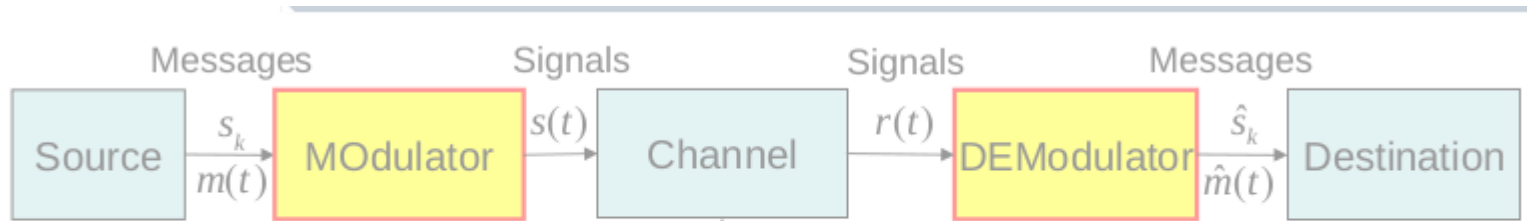
Sesión 1: Modelos, R, Pe, SNR y B.

Modelo digital síncrono de un sistema de transmisión digital (R, Pe)



Simulación ligera

Modelo de señal síncrono de un sistema de transmisión digital (R, Pe, SNR y B)

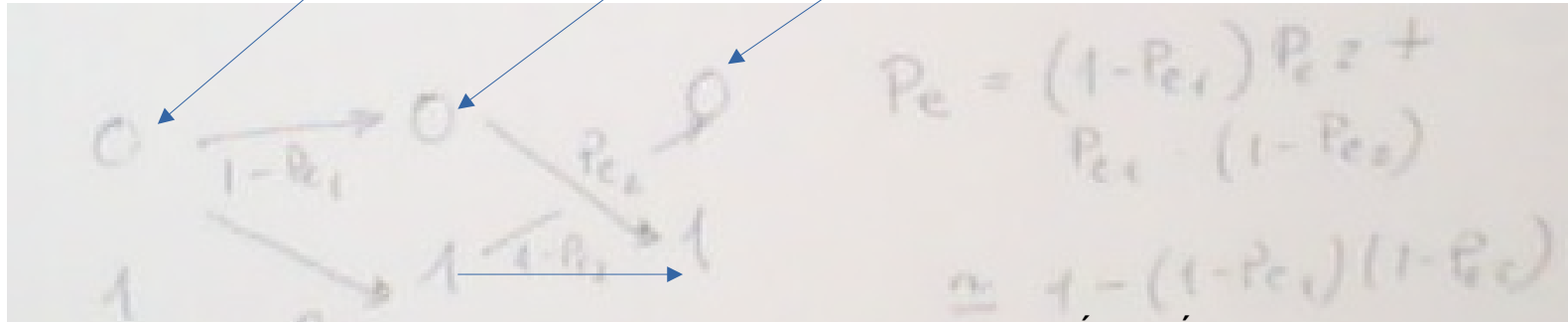
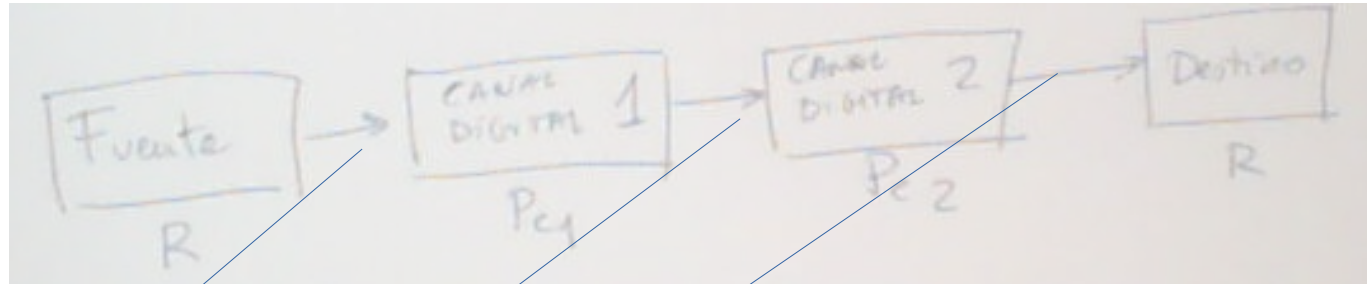


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Concatenación de canales digitales síncronos



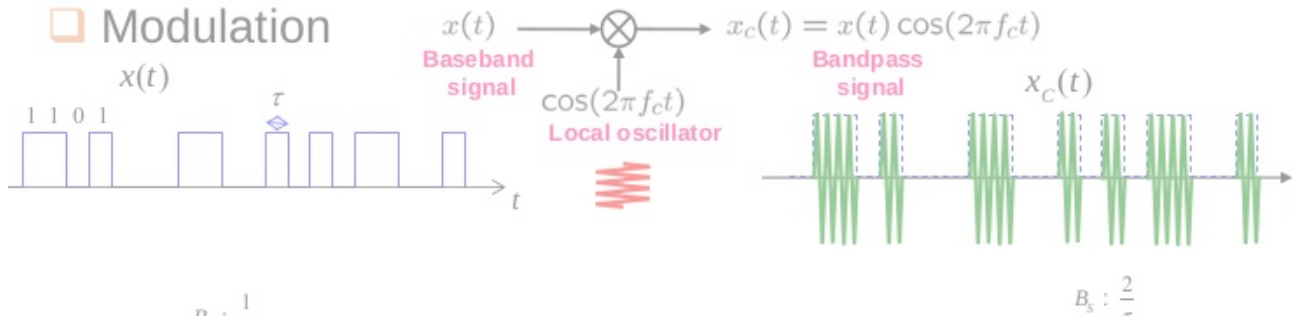
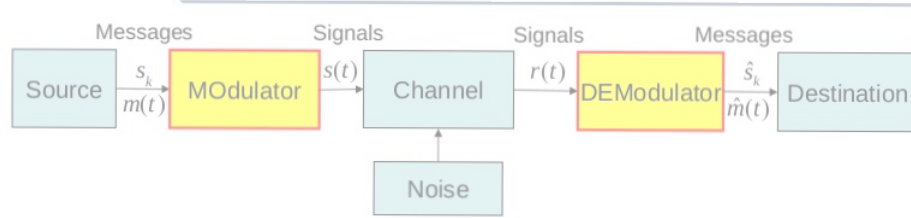
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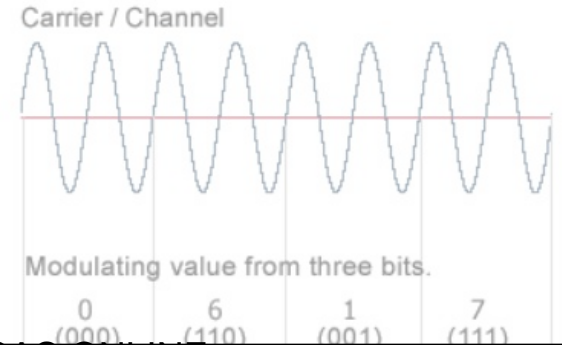
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Modelo de señal: ancho de banda

$$r(t) = C s(t) + n(t)$$



DIGITAL QAM (8QAM)



Signal Bandwidth, B_s [Hz]

- difference between the "upper" and "lower" limits of the signal's spectrum
- Only on the positive half of the frequency axis

Banda estrecha

Eficiencia espectral, η

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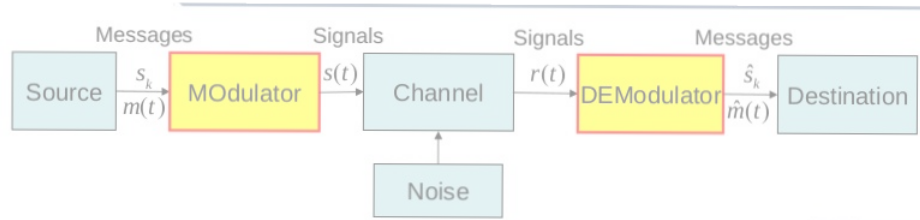
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$R = B \cdot \eta$

Modelo de señal: SNR

$$r(t) = C s(t) + n(t)$$



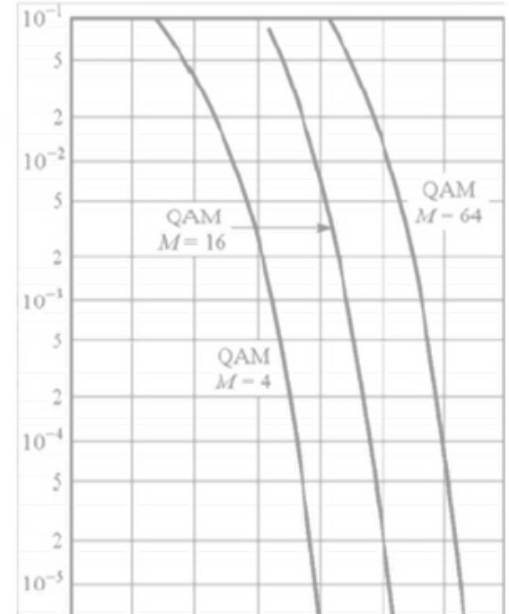
Potencia

$$P_x = \lim_{T \rightarrow \infty} \frac{1}{T} \int_{-T/2}^{T/2} x^2(t) dt$$

$$P_e = f(\text{SNR})$$

$$\text{SNR} = \text{Pot}(C s) / \text{Pot}(n)$$

$$\frac{E_b}{N_0} = \frac{S T_b}{N/W} = \frac{S/R_b}{N/W}$$



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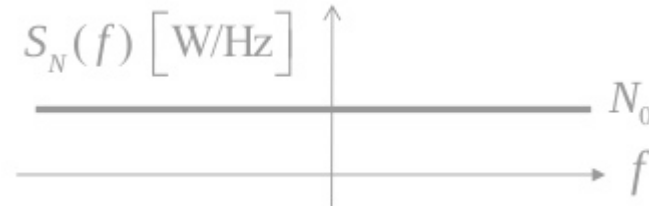
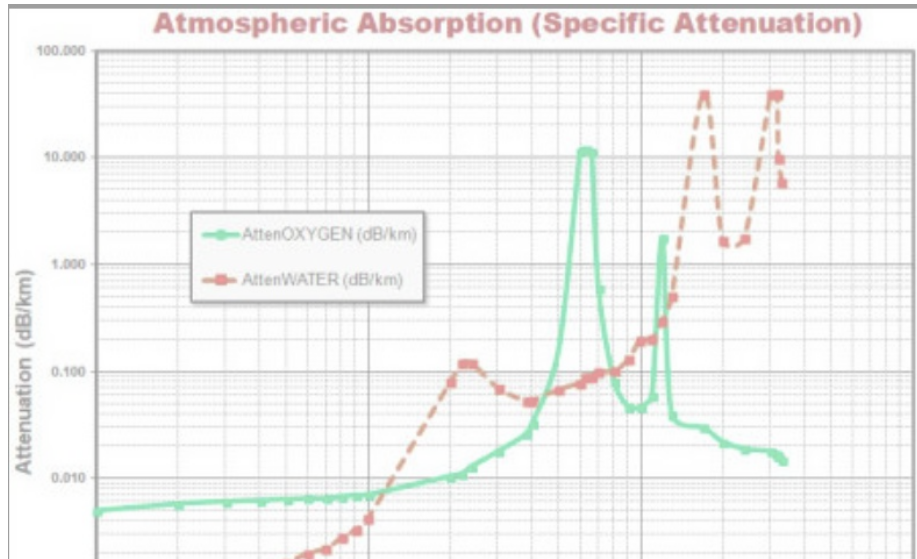
$[E_b/N_0] [dB]$

Canal: atenuación y ruido

$$r(t) = C s(t) + n(t)$$

Atenuación $Pot(r_señal) = Pot(s) * C^2$

Ruido $Pot(n) = N_0 * B$



$$\text{Attenuation} = 20 * \log_{10} (1/C)$$

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