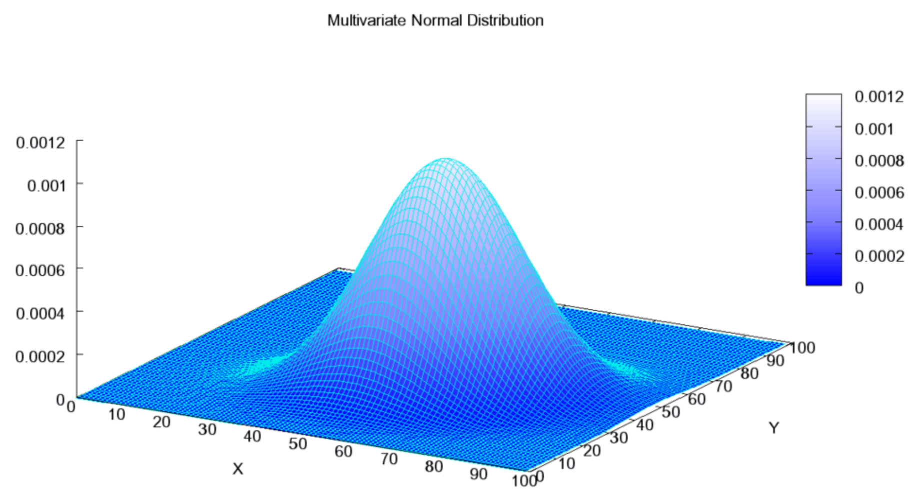
Quinta Clase 03/04

Repaso leve de Teoria de Señales (mal) -> Ortogonalidad, Bases y nosequemas.

Vector aleatorio Gaussiano. $\mathbb{R}^2 \to \mathbb{R}$

Multivariate Normal Distribution:



Terminamos de ver el capitulo 2.

Capitulo 3

Empezamos a ver el tiempo Continuo.

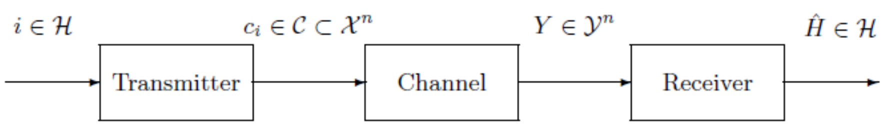


Figure 2.1. General setup for Chapter 2.

Ruido Gaussiano Blanco:

$$Z(t) = \int N(\alpha)h(t-\alpha)d\alpha$$
$$Z(t_i) = \int N(\alpha)h(t_i-\alpha)d\alpha$$

DEFINITION 3.4 *$N(t)$ is white Gaussian noise of power spectral density $\frac{N_0}{2}$ if, for any finite collection of real-valued $\mathcal{L}_2$ functions $g_1(\alpha), \ldots, g_k(\alpha)$,*

$$Z_i = \int N(\alpha) g_i(\alpha) d\alpha, \quad i = 1, 2, \ldots, k \tag{3.2}$$

is a collection of zero-mean jointly Gaussian random variables of covariance

$$\operatorname{cov}(Z_i, Z_j) = \mathbb{E}\left[Z_i Z_j^*\right] = \frac{N_0}{2} \int g_i(t) g_j^*(t) dt = \frac{N_0}{2} \langle g_i, g_j \rangle. \tag{3.3}$$

$Z = [Z_1, Z_2, ..., Z_n]$

$E_{[Z]} = [E_{[Z_1]}, E_{[Z_2]}, ..., E_{[Z_n]}] = [0, 0, 0]$

$\operatorname{cov}(Z_i, Z_j) = \frac{N_0}{2} \langle g_i, g_j \rangle$

$\operatorname{cov}(Z_1, Z_1) = \mathbb{E}[Z_1, Z_1]$
con $Z_1 = \int N(\alpha) g_1(\alpha) d\alpha$

Z_i es una observacion, una variable aleatoria.

La covarianza es 2x2, KxK.

K mediciones (?).

$Z_n = Z_1(t_0), Z_2(t_1), ..., Z_n(t_n)$
...
$Z_k = Z_k(t_o), Z_k(t_1), ..., Z_k(t_n)$

$Z_n, ..., Z_k = Z$

Luego: $Z = (Z_1, ..., Z_k)^T$

Matriz de Covarianza:

$$\begin{bmatrix} \operatorname{cov}(Z_1, Z_1) & \operatorname{cov}(Z_1, Z_2) \\ \operatorname{cov}(Z_2, Z_1) & \operatorname{cov}(Z_2, Z_2) \end{bmatrix} = $$
$$\begin{bmatrix} \sigma_1^2 = N_0/2 & \phi \\ \phi & \sigma_2^2 = N_0/2 \end{bmatrix}^{= \frac{N_0}{2} \langle \rho_i(t), \rho_i(t) \rangle}$$

Arquitectura del Transmisor-Receptor:

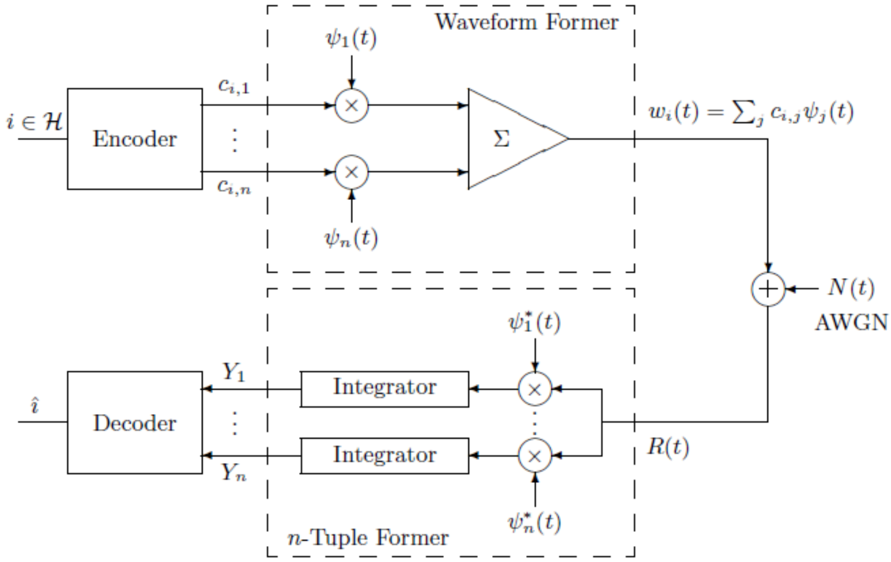


Figure 3.4. Decomposed transmitter and receiver.

NOTA:

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La varianza de una señal aleatoria es la potencia de la señal
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