Correlación Cruzada

$$\boxed{\Gamma_{fg}[n] = \sum_{m=-\infty}^{\infty} f(n+m)\, g[m]} \quad (1)$$

$k = n+m$ ; $m = k-n$

$$\Gamma_{fg}[n] = \sum_{k=-\infty}^{\infty} f[k]\, g[k-n]$$

$$\boxed{\Gamma_{fg}(n) = \sum_{m'=-\infty}^{\infty} f(m')\, g[m'-n]} \quad m' = k$$

$$\Gamma_{fg}(n) = \sum_{m=-\infty}^{\infty} f(m)\, g(m-n) = \sum_{m=-\infty}^{\infty} f(m)\, g(-(n-m))$$

$$= \underbrace{\sum_{m=-\infty}^{\infty} f[n]\Big|_{n\to m}\; g(-n)\Big|_{n\to(n-m)}}_{f(n) * g(-n)} =$$

$\Gamma_{ff}$ = autocorrelación

$\Gamma_{f\varphi} \neq \Gamma_{\varphi f}$

Convolución

$$\sum_{k=-\infty}^{\infty} x(n) \cdot y(n-k) = x(n) * y(n)$$

Prop.

$$\Gamma_{f\varphi}[n] = \Gamma_{\varphi f}[-n]$$

$$\Gamma_{ff}[n] = \Gamma_{ff}[-n] \quad \text{(PARIDAD)}$$

$$\Gamma_{ff}[0] = E_f$$

$$\Gamma_{ff}[0] = \sum_{n=-\infty}^{\infty} f[n] \cdot f[n-0]$$

$$= \sum_{n=-\infty}^{\infty} F^2[n]$$

$$= E_F \quad (\text{para un fn real})$$

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no siempre existe
puede no converger

presenta problema para señales periódicas

Definición general