$$R_{xy}(\tau) = x(\tau) * \overline{y(-\tau)} = \int_{-\infty}^{+\infty} x(t+\tau)y(t)dt$$

Propiedades:

$$|R_{xy}(\tau)|^2 < E_x E_y$$

$$R_{xy}(\tau) = \overline{R_{yx}(-\tau)}$$

$$R_{xy}(\tau) \leftrightarrow X(f)\overline{Y(f)} = G_{xy}(f)$$

Función de autocorrelación

$$R_{xx}(\tau) = \int_{-\infty}^{+\infty} x(t+\tau)\overline{x(t)}dt = x(\tau) * \overline{x(-\tau}$$

Densidad espectral de Energía

$$F\{R_{xx}(\tau)\} = X(f)\overline{X(f)} = |X(f)|^2 = G_{xx}$$

Propiedades:

$$R_{xx}(0) = E_X$$

$$|R_{xx}(\tau)| \le R_{xx}(0)$$

$$R_{xx}(\tau) = \overline{R_{xx}(-\tau)}$$

$$F\{R_{xx}(\tau)\} \ge 0, \forall f$$

$$z(t) = x(t) + y(t)$$

$$: R_{zz}(\tau) = R_{xx}(\tau) + R_{yy}(\tau) + R_{xy}(\tau) + R$$

$$: E_{zz} = E_x + E_y + R_{xy}(0) + R_{yx}(0)$$

x,y

son incoherentes sii: $R_{xy}(0) + R_{yx}(0) = 2\,\mathrm{Re}\{R_{xy}(0)\} =$

son ortogonales sii: $R_{xy}(0) = R_{yx}(0) =$

son incorreladas sii: $R_{xy}(\tau) = R_{yx}(\tau) = 0, \forall$

Correlación y Densidad Espectral de Energía a través de sistemas lineales

$$y(t) = x(t) * h(t) = \int_{-\infty}^{+\infty} x(\tau)h(t-\tau)d\tau$$

$$R_{xy}(\tau) = R_{xx}(\tau) * \overline{h(-\tau)}$$

$$R_{yx}(\tau) = R_{xx}(\tau) * h(\tau)$$

$$R_{yy}(\tau) = R_{xx}(\tau) * h(\tau) * \overline{h(-\tau)}$$

$$G_{xy}(f) = G_{xx}(f)\overline{H(f)}$$

$$G_{yx}(f) = G_{xx}(f)H(f)$$

$$G_{yy}(f) = G_{xx}(f)|H(f)|^2$$

Correlación y Densidad espectral de potencia de señales de P.M.F.

Correlacuón de señales de P.M.F.

$$R_{xy}(\tau) = \lim_{T\to\infty} \frac{1}{T} \int_{-T/2}^{T/2} x(t+\tau)y^*(t)dt$$

$$R_{xx}(\tau) = \lim_{T\to\infty} \frac{1}{T} \int_{-T/2}^{T/2} x(t+\tau)x^*(t)dt$$

Propiedades:

$$R_{xy}(\tau) \le P_x P_y$$

$$R_{xy}(\tau) = R_{yx}^*(-\tau)$$

$$|R_{xx}(\tau)| \le R_{xx}(0)$$

$$R_{xx}(\tau) = R_{xx}^*(-\tau)$$

$$P_{xx}(0) = P_x$$

Densidad espectral de potencia

$$S_{xx}(f) = \lim_{T\to\infty} \frac{1}{T} G_{X_T X_T(f)}$$

$$F\{R_{xx}(\tau)\} = S_{xx}\{f\}$$

$$R_{xx}(\tau) = \lim_{T\to\infty} \frac{1}{T} R_{x_T x_T}(\tau)$$