2.5 Summary

Finite signal $E_x^T = \int_{-T/2}^{T/2} x^2(t)\,dt$ $P_x^T = \frac{1}{T}\int_{-T/2}^{T/2} x^2(t)\,dt$

energy signal: $E_x = \int_{-\infty}^{\infty} x^2(t)\,dt$: total E

power signal: $P_x = \lim_{T\to\infty} \frac{1}{T}\int_{-T/2}^{T/2} x^2(t)\,dt$: avg. P

periodic power signal: $P_x = \frac{1}{T_0}\int_{-T_0/2}^{T_0/2} x^2(t)\,dt$: avg. P

ESD : $\psi_x(f) = |X(f)|^2$ (F.T. sqrd. of energy signal)

PSD : $G_x(f) = \sum_{n=-\infty}^{\infty} |c_n|^2 \delta(f - nf_0)$ (periodic)

$G_x(f) = \lim_{T\to\infty} \frac{1}{T} |X_T(f)|^2$ (non-periodic)

Autocorrelation

ENERGY SIGNAL

$R_x(\tau) = \int_{-\infty}^{\infty} x(t)x(t+\tau)\,dt$

$\psi_x(f) = F.T.\{R_x(\tau)\}$

POWER SIGNAL

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

$G_x(f) = F.T.\{R_x(\tau)\}$