Random processes

Properties of random processes

- Expected value of signal at time t:

$$ \mu_X(t) = E[X(t)] $$

- Autocorrelation of signal at times t_1 and t_2:

$$ R_{XX}(t_1, t_2) = E[X(t_1)X(t_2)] $$

- Autocovariance of signal at times t_1 and t_2:

$$ C_{XX}(t_1, t_2) = E[\tilde{X}(t_1)\tilde{X}(t_2)] = R_{XX}(t_1, t_2) - \mu_X(t_1)\mu_X(t_2) $$

where $\tilde{X}(t) = X(t) - \mu_X(t)$

Properties of two random processes

- Cross-correlation of $X(t_1)$ and $Y(t_2)$:

$$ R_{XY}(t_1, t_2) = E[X(t_1)Y(t_2)] $$

- Cross-covariance of $X(t_1)$ and $Y(t_2)$:

$$ C_{XY}(t_1, t_2) = E[\tilde{X}(t_1)\tilde{Y}(t_2)] $$