

STOCHASTIC PROCESSES

- stochastic process $X(t)$ - time variations that can also be discrete/continuous
- iid random sequence
- Bernoulli process
- Poisson process
- Brownian motion process

STOCHASTIC PROCESSES

- Expected Value : $\mu_X(t) = E[X(t)]$
- Autocovariance : $C_X(t, \tau) = \text{Cov}[X(t), X(t + \tau)]$
- Autocorrelation : $R_X(t, \tau) = E[X(t) \cdot X(t + \tau)]$

$$C_X(t, \tau) = R_X(t, \tau) - \mu_X(t) \cdot \mu_X(t + \tau)$$

STATIONARY PROCESSES

- time translation symmetry ==>

$$\mu_X(t) = \mu_X \quad , \quad R_X(\tau) = E[X(t) \cdot X(t + \tau)]$$

- **wide sense stationary** : if above holds
- wss : $R_X(0) \geq |R_X(\tau)|$
- average power in wss : $R_X(0) = E[X^2(t)]$
