

UNIT-III

1. A **stochastic process** is:

- a) A deterministic function of time b) A collection of random variables indexed by time c) A fixed probability distribution d) A purely periodic signal

Answer: b

2. A process is **wide-sense stationary** if:

- a) Its mean is constant and autocorrelation depends only on time difference b) Its variance changes with time c) Its distribution is Gaussian d) It is deterministic

Answer: a

3. A **deterministic process** is:

- a) Fully predictable b) Governed by probability distributions c) Always Gaussian d) Always stationary

Answer: a

4. The **autocorrelation function** of a stationary process is always:

- a) Asymmetric b) Symmetric about zero lag c) Negative at zero lag d) Constant for all lags

Answer: b

5. A process is **mean-ergodic** if:

- a) Time average of mean equals ensemble mean b) Time average of correlation equals ensemble correlation c) Mean changes with time d) It is Gaussian

Answer: a

6. A **Gaussian random process** is fully described by:

- a) Mean and variance only b) Mean and covariance function c) Higher-order moments d) Probability density of order 3

Answer: b

7. The **cross-correlation function** measures:

- a) Dependence of a process on itself b) Dependence between two different processes c) Variance of a process d) Gaussianity of a process

Answer: b

8. A process is **strict-sense stationary** if:

- a) Mean is constant b) Autocorrelation depends only on lag c) All finite-dimensional distributions are invariant under time shift d) It is Gaussian

Answer: c

9. The **covariance function** is:

- a) Always positive b) A measure of linear dependence between random variables at different times c) Equal to autocorrelation for Gaussian processes d) Independent of time **Answer: b**

10. In a **linear system response**, the output mean depends on:

- a) Input variance only b) Input mean and system impulse response c) Cross-correlation only d) Gaussianity of input **Answer: b**

Fill in the Blanks (FIBs)

1. A _____ process is one where all finite-dimensional distributions are invariant under time shift. **Answer: Strict-sense stationary**
2. The _____ function measures similarity of a process with itself at different time lags. **Answer: Autocorrelation**
3. In a linear system, the _____ of the output depends on the input mean and the system's impulse response. **Answer: Mean response**
4. A process is called _____ if time averages equal ensemble averages. **Answer: Ergodic**
5. The _____ function captures linear dependence between random variables at different times. **Answer: Covariance function**
6. A _____ process is fully predictable and not random. **Answer: Deterministic**
7. A _____ process is completely characterized by its mean and covariance function. **Answer: Gaussian random process**
8. The _____ function measures similarity between two different processes. **Answer: Cross-correlation**
9. A process is _____ if its mean is constant over time. **Answer: First-order stationary**
10. The _____ value of the output in a linear system is related to the input power and system transfer function. **Answer: Mean-squared**