

UNIT-IV

1. The **power spectrum** of a stochastic process describes:
 - a) Distribution of variance across frequencies
 - b) Distribution of mean across time
 - c) Autocorrelation at zero lag
 - d) Cross-correlation between two signals**Answer: a**

2. The **power spectrum** is the Fourier transform of:
 - a) Probability density function
 - b) Autocorrelation function
 - c) Cross-correlation function
 - d) Covariance function**Answer: b**

3. The **cross-power spectral density** describes:
 - a) Energy distribution of a single process
 - b) Frequency-domain relationship between two processes
 - c) Mean of a Gaussian process
 - d) Variance of a stationary process**Answer: b**

4. The **cross-power spectrum** is related to:
 - a) Cross-correlation function via Fourier transform
 - b) Autocorrelation function via Laplace transform
 - c) Probability distribution via z-transform
 - d) Mean function via differentiation**Answer: a**

5. The **power density spectrum of response** in a linear system is obtained by:
 - a) Multiplying input spectrum with system transfer function magnitude squared
 - b) Adding input mean to system impulse response
 - c) Differentiating autocorrelation function
 - d) Taking Laplace transform of covariance**Answer: a**

6. The **cross-power spectral density** between input and output of a linear system is:
 - a) Product of input spectrum and system transfer function
 - b) Sum of input autocorrelation and system impulse response
 - c) Fourier transform of covariance function
 - d) Independent of system properties**Answer: a**

7. The **power spectrum** is always
 - a) Negative
 - b) Non-negative
 - c) Complex
 - d) Zero for stationary processes**Answer: b**

8. The **autocorrelation function** and power spectrum are related by:

a) Fourier transform pair b) Laplace transform pair c) z-transform pair d) Hilbert transform pair **Answer:** a

9. The **cross-correlation function** and cross-power spectrum are related by

a) Fourier transform pair b) Laplace transform pair c) z-transform pair d) Hilbert transform pair **Answer:** a

10. The **power density spectrum** of the output of a linear system depends on:

a) Input spectrum and system transfer function b) Input mean only c) Cross-correlation only d) Gaussianity of input **Answer:** a

Fill in the Blanks

1. The _____ is the Fourier transform of the autocorrelation function. **Answer:** Power spectrum
2. The _____ function describes the frequency-domain relationship between two processes. **Answer:** Cross-power spectral density
3. The _____ and power spectrum form a Fourier transform pair. **Answer:** Autocorrelation function
4. The _____ and cross-power spectrum form a Fourier transform pair. **Answer:** Cross-correlation function
5. The _____ of a linear system's output is obtained by multiplying input spectrum with $|H(f)|^2$. **Answer:** Power density spectrum
6. The _____ between input and output of a linear system is the product of input spectrum and system transfer function. **Answer:** Cross-power spectral density
7. The _____ is always non-negative, representing distribution of variance across frequencies. **Answer:** Power spectrum
8. The _____ function in time domain corresponds to power spectrum in frequency domain. **Answer:** Autocorrelation
9. The _____ function in time domain corresponds to cross-power spectrum in frequency domain. **Answer:** Cross-correlation
10. The _____ of system response depends on both input spectrum and system transfer function. **Answer:** Power density spectrum