1. Which of the following best describes the z-transform?
a) A technique used in image processing
b) A method for analyzing discrete-time systems in the frequency domain
c) A method for converting analog signals to digital signals
d) A technique used for solving differential equations

Answer: b) A method for analyzing discrete-time systems in the frequency domain

Explanation: The z-transform is a mathematical tool used for analyzing discrete-time systems in the frequency domain, similar to how the Laplace transform is used for continuous-time systems.

2. What is the Region of Convergence (ROC) of a finite duration sequence in z-transform?
a) Inside the unit circle
b) Outside the unit circle
c) On the unit circle
d) Cannot be determined

Answer: c) On the unit circle

Explanation: For a finite duration sequence, the ROC of its z-transform lies on the unit circle in the z-plane.

3. In the z-transform, what does the Region of Convergence (ROC) of an infinite duration sequence indicate?
a) Stability of the sequence
b) Convergence of the sequence
c) Causality of the sequence

d) Frequency response of the sequence

Answer: b) Convergence of the sequence

Explanation: The ROC of an infinite duration sequence indicates the range of values for which the z-transform converges, indicating the convergence behavior of the sequence.

4. What is the relationship between Discrete-Time Fourier Transform (DTFT) and z-transform?
a) They are the same
b) DTFT is a special case of z-transform
c) z-transform is a special case of DTFT
d) They are unrelated

Answer: c) z-transform is a special case of DTFT

Explanation: The z-transform is essentially a sampled version of the Laplace transform, which makes it a special case of the DTFT.

5. Which of the following is a property of the Region of Convergence (ROC) in the context of z-transform?
a) It can be any closed contour in the z-plane
b) It cannot include the unit circle
c) It remains constant for all z-transforms
d) It determines the range of convergence for the z-transform

Answer: d) It determines the range of convergence for the z-transform

Explanation: The ROC determines where the z-transform converges, indicating the range of

values for which the transform is valid.

6. What is a property of the z-transform regarding linearity?
a) Linearity implies the ROC is always outside the unit circle
b) Linearity implies the z-transform is always stable
c) Linearity implies the z-transform of a sum is the sum of the z-transforms
d) Linearity implies the z-transform cannot handle infinite sequences

Answer: c) Linearity implies the z-transform of a sum is the sum of the z-transforms

Explanation: The z-transform is linear, meaning that the transform of a sum of sequences is equal to the sum of their individual transforms.

7. How is the Inverse z-Transform related to the z-Transform?
a) It is the same as the z-Transform
b) It is the reciprocal of the z-Transform
c) It is used to convert z-Domain signals back to the time domain
d) It is used for frequency analysis of discrete-time systems

Answer: c) It is used to convert z-Domain signals back to the time domain

Explanation: The inverse z-transform is used to convert signals from the z-domain (frequency domain) back to the time domain.

8. What does the z-transform provide for the analysis of discrete-time LTI systems?
a) Frequency response
b) Impulse response
c) Step response

d) Transfer function

Answer: d) Transfer function

Explanation: The z-transform provides the transfer function of discrete-time LTI systems, allowing for their analysis in the frequency domain.

9. What does the Unilateral z-Transform focus on?
a) Signals in the past
b) Signals in the future
c) Signals in both past and future
d) Only present signals

Answer: b) Signals in the future

Explanation: The Unilateral z-Transform is concerned with signals that start at n=0 and extend into the future, ignoring past values.

10. Which property distinguishes the Unilateral z-Transform from the Bilateral z-Transform?
a) The range of n values
b) The range of z values
c) The presence of complex conjugate poles
d) The stability of the transform

Answer: a) The range of n values

Explanation: The Unilateral z-Transform considers signals starting at n=0, while the Bilateral z-Transform considers signals from -∞ to +∞, leading to different ranges of n values.

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