

EBU6018
Advanced Transform Methods

Week 2 Quiz

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Question 1

Which of the following statements is true? The Kronecker Delta function is used to define:

- A unit impulse at time zero.
- Mutual orthogonality between two functions.
- The admissibility of a wavelet function.
- The window function of a Gabor Transform.

Question 2

Which of the following statements is true? A Frame is a set of vectors for which:

- Coefficients are not unique, vectors are not independent, the frame constitutes a basis.
- Coefficients are unique, vectors are not independent, the frame does not constitute a basis.
- Coefficients are not unique, vectors are not independent, the frame does not constitute a basis.
- None of the above.

Question 3

With reference to the Fourier Transform, which of the following statements is true?:

- The basis functions are spread over the entire time domain.
- Gains time information since integration is performed over all time.
- Easy to discriminate signals that have the same frequency occurring at different times.
- Signals suitable for Fourier Transform must be time invariant.

Question 4

Which of the following statements is true? Two characteristics of the DCT that make it suitable for data compression are:

- Data decorrelation and data dependent basis functions.
- Data decorrelation and data independent basis functions.
- Data correlation and data dependent basis functions.
- None of the above.

Question 5

Which of the following statements is true? Short-Time Fourier Transforms:

- Cannot identify short duration transients in a signal.
- Have windows whose width is continuously variable.
- Does not use a Gaussian window.
- Have limited time-frequency resolution.

Question 6

Which of the following statements is true?:

- Sampling in the time domain is convolution with a comb of delta functions in the frequency domain.
- Sampling in the time domain is multiplication with a comb of delta functions in the frequency domain.
- Sampling replicates the spectrum of a continuous-time signal at non-integer multiples of sampling frequency.
- The sampling frequency must be no more than twice the signal bandwidth.

Question 7

Which of the following statements is true? The Uncertainty Principle states that:

- The uncertainty in the value of frequency is greater for high frequencies.
- The product of the uncertainties in time and in frequency is independent of the shape of the window function.
- The product of the uncertainties in time and in frequency depend on the transform being implemented.
- The product of the uncertainties in time and in frequency is 0.5.