Assignment 12

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2019-10-23, 23:59 IST.

1) Consider the wavelet system \([\psi(x), \phi(x)]\) which satisfies the MRA properties and
\[\phi_j(x) = 2^j \psi(2^j x - k), \psi_j(x) = 2^j \psi(2^j x - k)\] then which of the following is true?
\[\int_{-\infty}^{\infty} \phi_j(x) \phi_{j0}(x) dx = 0, j \geq 1\]
\[\int_{-\infty}^{\infty} \phi_j(x) \phi_{j0}(x) dx = \delta_{j0}\delta_{j0}\]
\[\int_{-\infty}^{\infty} \phi_j(x) \psi_{j0}(x) dx = 1\]
\[\int_{-\infty}^{\infty} \phi_j(x) \psi_{j0}(x) dx = -1\]

No, the answer is incorrect.
Score: 3
Accepted Answers:
\[\int_{-\infty}^{\infty} \phi_j(x) \phi_{j0}(x) dx = 0, j \geq 1\]
\[\int_{-\infty}^{\infty} \phi_j(x) \phi_{j0}(x) dx = \delta_{j0}\delta_{j0}\]
\[\int_{-\infty}^{\infty} \phi_j(x) \psi_{j0}(x) dx = 1\]

2) The wavelet coefficient A of \[w_j(x) = h(x) \phi_j(x)\] will decay faster for:
- high value of A
- high value of vanishing moment
- lower value of \[j\]
- lower value of \[A\]

No, the answer is incorrect.
Score: 3
Accepted Answers:
- high value of vanishing moment
- high value of \[A\]

3) The continuous wavelet transform \(W_{\psi}(h, a)f\) of \(f \in L^2(\mathbb{R})\) with respect to the Haar wavelet is given by:
\[|a|^{-1/2} \int_{-\infty}^{\infty} f(x) dx - |a|^{-1/2} \int_{-\infty}^{\infty} f(x) dx\]
\[|a|^{-1/2} \int_{0}^{1} f(ax + b) dx - |a|^{-1/2} \int_{0}^{1} f(ax + b) dx\]
\[|a|^{-1/2} \int_{0}^{1} f(ax + b) dx - |a|^{-1/2} \int_{0}^{1} f(ax + b) dx\]
\[|a|^{-1/2} \int_{0}^{1} f(ax + b) dx - |a|^{-1/2} \int_{0}^{1} f(ax + b) dx\]

No, the answer is incorrect.
Score: 3
Accepted Answers:
\[|a|^{-1/2} \int_{0}^{1} f(ax + b) dx - |a|^{-1/2} \int_{0}^{1} f(ax + b) dx\]

4) The wavelet equation is given by:
\[\psi(x) = \sqrt{2} \sum_{k=0}^{D-1} g_k \psi(2x - k)\] where \(G(\xi) = \sqrt{2} \sum_{k=0}^{D-1} g_k e^{-2\pi i \xi k}\)

then the Fourier transform of \(\psi(x)\) i.e. \(\hat{\psi}(\xi)\), is given by,
\[G(\xi) \hat{\phi}(\xi)\]
\[G(\xi) \hat{\phi}(\xi)\]
\[G(\xi) \hat{\phi}(\xi)\]
\[G(\xi) \hat{\phi}(\xi)\]

No, the answer is incorrect.
Score: 3
Accepted Answers:
\[G(\xi) \hat{\phi}(\xi)\]
\[G(\xi) \hat{\phi}(\xi)\]

5) The value of \(\hat{\psi}(4\pi n)\) is given by:

- 0
- 1

No, the answer is incorrect.
Score: 3
Accepted Answers:

6) The continuous wavelet transform \(W_{\psi}(0, 1) f\) of \(f(x) = x, x \in [-1, 1]\) with respect to the Haar wavelet is given by:
\[|a|^{-1/2} \int_{-1}^{1} f(x) dx - |a|^{-1/2} \int_{-1}^{1} f(x) dx\]
\[|a|^{-1/2} \int_{-1}^{1} f(x) dx - |a|^{-1/2} \int_{-1}^{1} f(x) dx\]
\[|a|^{-1/2} \int_{-1}^{1} f(x) dx - |a|^{-1/2} \int_{-1}^{1} f(x) dx\]
\[|a|^{-1/2} \int_{-1}^{1} f(x) dx - |a|^{-1/2} \int_{-1}^{1} f(x) dx\]

No, the answer is incorrect.
Score: 3
Accepted Answers:

- \[|a|^{-1/2} \int_{-1}^{1} f(x) dx - |a|^{-1/2} \int_{-1}^{1} f(x) dx\]