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NPTEL

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Courses » Introduction to Time-Frequency Analysis and Wavelet Transforms

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## Unit 16 - Week 11: Discrete Wavelet Transforms (Contd..)

### Course outline

Registration for  
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portal

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MATLAB Tutorials  
created by MathWorksWeek 1: Introduction,  
Basic definitions and  
ConceptsWeek 2: Fourier  
transforms (a review)Week 3: Duration and  
BandwidthWeek 4: Short-time  
Fourier transformWeek 5: Wigner-Ville  
DistributionsWeek 6: Wigner-Ville  
Distributions (Contd..)Week 7: Continuous  
Wavelet TransformsWeek 8: Continuous  
Wavelet Transforms  
(Contd..)Week 9: Discrete  
Wavelet TransformsWeek 10: Discrete  
Wavelet Transforms  
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Wavelet Transforms  
(Contd..)● Lecture 8.4A: Wavelets  
for DWT (Part 1)● Lecture 8.4B: Wavelets  
for DWT (Part 2)● Lecture 8.4C: Wavelets  
for DWT (Part 3)● Lecture 8.5A: MATLAB  
Demonstration○ Model questions for final  
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model question

Week 12: DWT (Contd..) and Closing Summary

### Assignment for week 10 and week 11

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

Due on 2016-10-02, 23:59 IST

- 1) 1 point
1. Which of the following is/are TRUE regarding DWT using orthonormal basis functions?
- (a) Scaling functions and its translates at a particular scale are orthonormal.
  - (b) Wavelet and its translates are orthonormal at a particular scale.
  - (c) Scaling functions across different scales are orthonormal.
  - (d) Wavelets across different scales are orthonormal.

- a
- b
- c
- d

No, the answer is incorrect.  
Score: 0

Accepted Answers:

a  
b  
d

- 2) 1 point
2. Select the correct statement with respect to MRA:
- (a) Any function in  $V_{m-1}$  can be expressed using the basis functions of  $V_m$ .
  - (b) Any function in  $W_{m-1}$  can be expressed using the basis functions of  $V_{m-1}$ .
  - (c) Any function in  $W_m$  can be expressed using the basis functions of  $V_{m-1}$ .
  - (d) All of the above.

- a
- b
- c
- d

No, the answer is incorrect.  
Score: 0

Accepted Answers:

c

- 3) 1 point
3. Which of the following is/are **incorrect** w.r.t. biorthogonal wavelet transform?
- (a) The synthesis and analysing functions are identical in a biorthogonal wavelet transform.
  - (b) The analysing scaling and wavelet functions are orthogonal to each other.
  - (c) The analysis scaling and the synthesis wavelet functions are orthogonal to each other.
  - (d) The synthesis scaling and the analysing wavelet functions are orthogonal to each other.

- a
- b
- c
- d

No, the answer is incorrect.

Score: 0

Accepted Answers:

a  
b

4)

1 point

4. Select the correct statement(s) from the following:

- (a) Daubechies wavelets are non-orthogonal.
- (b) For given vanishing moments, Coiflets are wider than Daubechies wavelets.
- (c) Daubechies wavelets are symmetric.
- (d) Coiflets are orthogonal.

- a
- b
- c
- d

No, the answer is incorrect.

Score: 0

Accepted Answers:

b  
d

5)

1 point

5. Which of the following statement(s) is/are correct with respect to the Haar wavelet

- (a)  $\sqrt{2}\phi(t) = \phi(2t) + \phi(2t - 1)$
- (b)  $\psi(t) = \psi(2t) + \psi(2t - 1)$
- (c)  $\psi(t) = \phi(2t) - \phi(2t - 1)$
- (d)  $\sqrt{2}\phi(t) = \phi(2t) - \phi(2t - 1)$

- a
- b
- c
- d

No, the answer is incorrect.

Score: 0

Accepted Answers:

c

6)

6. For a signal of length 256, coarsest approximation coefficients are obtained at the level  $J$ . The length of detail coefficients available at level  $P$  is 32. The value of  $J - P$  is \_\_\_\_\_.  
**Note:** Assume that the signal is available at level 0.

\_\_\_\_\_

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: String) 5

1 point

7)

7. A discrete time signal,  $x[k]$  (available at level 0) is decomposed using a 'Haar' wavelet. The approximation and detail coefficients at level 1 are  $[3\sqrt{2}, 2\sqrt{2}, 6\sqrt{2}, 3\sqrt{2}]$  and  $[-\sqrt{2}, 0, 2\sqrt{2}, -\sqrt{2}]$  respectively. The value of  $\sum_{k=0}^N x[k]$ , where  $N$  being the length of the signal is \_\_\_\_\_.

\_\_\_\_\_

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: String) 28

1 point

8)

8. A continuous time signal,  $x(t) = \frac{2}{t+1} + e^{-t}$ ,  $0 \leq t < 0.8$  is sampled at a frequency  $f$  Hz starting at  $t = 0$ . The approximation (reconstructed) of the signal at the coarse possible scale using a Haar wavelet is \_\_\_\_\_.(Report the answer to one decimal place)

No, the answer is incorrect.

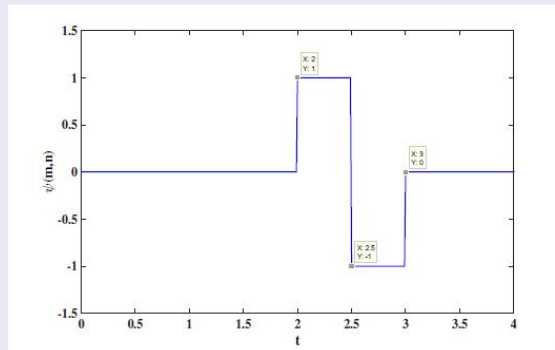
Score: 0

Accepted Answers:

(Type: String) 2.2

9)

9. The function given below is a Haar wavelet function  $\psi_{m,n}$  used for dyadic DWT.



Which of the following is an appropriate notation for the given function?

- (a)  $\psi_{2,3}$
- (b)  $\psi_{0,2}$
- (c)  $\psi_{1,2}$
- (d)  $\psi_{1,3}$

- a
- b
- c
- d

No, the answer is incorrect.

Score: 0

Accepted Answers:

b

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