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Courses » Introduction to Time-Frequency Analysis and Wavelet Transforms

Announcements   **Course**   Ask a Question   Progress

Unit 7 - Week 2: Fourier transforms (a review)

Week 2 Assignment

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

Due on 2016-08-08, 23:59 IST

1)   *1 point*

1. Select the correct statement from the following:
   a. Fourier transforms work with adaptive basis.
   b. Wavelet transforms work with fixed basis.
   c. Fourier transforms work with fixed basis while wavelet transforms work with adaptive ba
   d. None of the above.

○ a
○ b
○ c
○ d

No, the answer is incorrect.
Score: 0

Accepted Answers:
b

2)   *1 point*

2. Select the correct option(s) from the following.
   a. The analysis equation allows us to determine the atoms that make a signal.
   b. The synthesis equation describes how a signal is imagined to be constructed.
   c. The analysis equation allows us to imagine how a signal is constructed.
   d. The synthesis equation describes the atoms which take part in building a signal.

☐ a
☐ b
☐ c
☐ d

No, the answer is incorrect.
Score: 0

Accepted Answers:
a
b

3)   *1 point*

3. Which of the following is TRUE regarding continuous time periodic signals?
   a. They have infinite power and finite energy.
   b. They have finite power and infinite energy.
   c. They have neither finite power nor finite energy.
   d. None of the above.

○ a
○ b
○ c
○ d

No, the answer is incorrect.
Score: 0

Accepted Answers:

b

4)   *1 point*

4. The Fourier series of a continuous time periodic signal $x(t)$ is

$$x(t) = \sum c_n e^{j2\pi n F_0 t}$$

Which of the following is/are TRUE?

a. c_n represents the power contribution of the nth harmonic.
b. $|c_n|$ is a measure of extent of correlation between the signal and the nth harmonic.
c. $|c_n|^2$ represents the power contribution of the nth harmonic to signal power.
d. None of the above

☐ a
☐ b
☐ c
☐ d

No, the answer is incorrect.
Score: 0

Accepted Answers:
b
c

5)   *1 point*

5. Which of the following qualify/qualifies to be a fundamental frequency range for a discrete-time signal?

a. $\omega \in [-\pi, \pi]$.
b. $\omega \in \left[-\frac{\pi}{8}, \frac{15\pi}{8}\right]$.
c. $\omega \in \left[-\frac{\pi}{2}, \frac{3\pi}{2}\right)$.
d. $\omega \in \left[-\frac{\pi}{4}, \frac{7\pi}{4}\right)$.

☐ a
☐ b
☐ c
☐ d

No, the answer is incorrect.
Score: 0

Accepted Answers:
c
d

6)   *1 point*

6. The input and ouput of an LTI system are related as $x_2[k] = G(q^{-1})x_1[k]$. Which of following is/are TRUE with respect to energy spectral density?

a. $S_{x_2 x_1}(f) = X_2(f)X_1^*(f)$
b. $S_{x_2 x_1}(f) = G(e^{-j2\pi f})S_{x_1 x_1}(f)$
c. $S_{x_2 x_2}(f) = |G(e^{-j2\pi f})|^2 S_{x_1 x_1}(f)$
d. None of these

☐ a
☐ b
☐ c
☐ d

No, the answer is incorrect.
Score: 0

Accepted Answers:
a
b
c

7)   *1 point*

7. Which of the following statement(s) is/are TRUE?

   a. The power spectrum of the autocovariance $P_{\sigma\sigma}[n]$ is the Fourier transform of the signa

   b. The power spectrum of the signal $P_{xx}[n]$ is the Fourier transform of the autocovariance

   c. Both (a) and (b).

   d. Neither (a) nor (b).

   ○ a

   ○ b

   ○ c

   ○ d

No, the answer is incorrect.

Score: 0

Accepted Answers:

b

8)   *1 point*

8. If $x[k] \xrightarrow{\mathcal{F}} X(f)$, then select the correct option(s):

   a. $x\left[\frac{k-D}{\alpha}\right] \xrightarrow{\mathcal{F}} e^{-j\frac{2\pi fD}{\alpha}} X(\alpha f)$.

   b. $x\left[\frac{k}{\alpha} - D\right] \xrightarrow{\mathcal{F}} e^{-j2\pi f\alpha D} X(\alpha f)$.

   c. $e^{2\pi f_0\alpha k} x[\alpha k] \xrightarrow{\mathcal{F}} X(\frac{f-\alpha f_0}{\alpha})$

   d. $e^{2\pi f_0\alpha k} x\left[\frac{k}{\alpha}\right] \xrightarrow{\mathcal{F}} X(\frac{f+\alpha f_0}{\alpha})$

   ☐ a

   ☐ b

   ☐ c

   ☐ d

No, the answer is incorrect.

Score: 0

Accepted Answers:

b

c

9)   *1 point*

   ○ a

   ○ b

   ○ c

   ○ d

No, the answer is incorrect.

Score: 0

Accepted Answers:

b

10)

For the questions **10** to **15** the answer has to be filled as a **numeric value** (report the v to the nearest integer).

10. The number of unique frequencies in a 512-point DFT is _____.

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: String) 257

                                                  1 point

11)

11. The average power of the signal $x(t) = \sin(t) + \cos(t)$ is _____.

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: String) 1

                                                  1 point

12)

A signal is provided in the data file **a2_sigData.mat**. For the given signal answer the qu
12 to **15** using **MATLAB**.

12. The number of periodicities present in the given signal is _____.

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: String) 3

1 p...

13)

13. If the frequency corresponding to the maximum power is f (cycles/sample). Then
value of $10f$ is _____.

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: String) 1

1 point

14)

14. The value of total power of the signal in the frequency band $[0, 0.5)$ cycles/sample

_____.

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: String) 61

1 point

15)

15. The absolute value of **third** element of N-point DFT vector is _____.
(Note: N is the number of data points)

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: String) 1

1 point

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