Unit 8 - Week 3: Duration and Bandwidth

Week 3 Assignment

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

Due on 2016-08-15, 23:59 IST.

1) *1 point*

1. Select the correct **statement(s)** with reference to the given signals:

$$x_1[k] = \begin{cases} \sin(0.2\pi k) & \forall k \in \{0, 1, \ldots, 59\} \\ \sin(0.3\pi k) & \forall k \in \{60, 61, \ldots, 119\} \end{cases}$$

$$x_2[k] = \begin{cases} \sin(0.3\pi k) & \forall k \in \{0, 1, \ldots, 59\} \\ \sin(0.2\pi k) & \forall k \in \{60, 61, \ldots, 119\} \end{cases}$$

a. Both the signals are stationary.
b. $x_1[k] + x_2[k]$ is a stationary signal.
c. The spectra of both the signals are identical.
d. The spectra of both the signals are completely different.

- [ ] a
- [ ] b
- [ ] c
- [ ] d

No, the answer is incorrect.
Score: 0

Accepted Answers:
b
c

2) *1 point*

2. Fourier transform is well suited to analyze
   a. Linear chirps
   b. Quadratic chirps
   c. Both linear and quadratic chirps
   d. None of the above

- ( ) a
- ( ) b
- ( ) c
- ( ) d

No, the answer is incorrect.
Score: 0

Accepted Answers:
d

3) 1 point

3. Which of the following statements concerning the bandwidth of the signal $x(t) = \left(\frac{\alpha}{\pi}\right)^{\frac{1}{4}} e^{-\alpha(t-2)^2} e^{j\omega_0 t}$ are correct?

a. It has non-zero contributions from both amplitude & frequency modulation.
b. It has non-zero contribution only from amplitude modulation.
c. It has equal contributions from both amplitude & frequency modulation.
d. None of the above.

- a
- b
- c
- d

No, the answer is incorrect.
Score: 0

Accepted Answers:
b

4) 1 point

4. Given $0 \leq \omega_2 \leq \omega_1$, the analytic representation for the signal $x(t) = \sin(\omega_1 t)\sin(\omega$

a. $\cos(\omega_1 t)e^{j\omega_2 t}$
b. $\cos(\omega_2 t)e^{j\omega_1 t}$
c. $\sin(\omega_1 t)e^{j\omega_2 t}$
d. $\sin(\omega_2 t)e^{j\omega_1 t}$

- a
- b
- c
- d

No, the answer is incorrect.
Score: 0

Accepted Answers:
d

5) 1 point

- a
- b
- c
- d

No, the answer is incorrect.
Score: 0

Accepted Answers:
b
c

6) 1 point

6. For a continuous-time signal $x(t)$ which is a Gaussian amplitude modulated sine w
frequency ω_0:

a. The product of $\langle t \rangle$ and $\langle \omega \rangle$ is 0.
b. The value of $\left\langle t\dot{\phi}(t) \right\rangle$ is 0.
c. The value of $\left\langle t\dot{\phi}(t) \right\rangle$ is equal to $\langle t \rangle \langle \omega \rangle$.
d. None of the above.

- a
- b
- c
- d

No, the answer is incorrect.
Score: 0

Accepted Answers:
c

7)

Questions **7** to **11** are based on the following signal (Answers for these questions have t reported as an **integer**):

$$x(t) = \left(\frac{2}{\pi}\right)^{\frac{1}{4}} e^{-t^2+jt^2+jt}$$

7. Suppose the duration of the given signal is denoted by σ_t. The value of $6\sigma_t$ is ___

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: String) 3

1 p

8)

8. Suppose the bandwidth of the given signal is denoted by σ_ω. The value of σ_ω^2 is __

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: String) 2

1 point

9)

9. The instantaneous frequency of the signal is ___ $t + 1$ rad/sec.

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: String) 2

1 point

10)

10. The value of $\frac{B_{AM}}{B_{FM}}$ for the given signal is ___

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: String) 1

1 point

11)

11. If covariance of the signal is denoted by $\sigma_{t\omega}$, the value of $10\sigma_{t\omega}$ is _____.

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: String) 5

1 point

12)

Questions **12** to **15** requires usage of the Time-Frequency Toolbox (`tftb`) in MATLAB. A is provided in the data file `a3_sigData.mat`. The time stamps of the signal are given vector (0:1:127).
(Round off the answers to these questions to **one decimal** place.)

12. The mean time for the given signal is _____

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: String) 50.0
(Type: String) 50

1 point

13)

13. The center frequency for the given signal is _____ rad/sec.

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: String) 0.9

1 p

14)

14. The bandwidth (σ_ω) for the given signal is _____.

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: String) 0.1

1 point

15)

15. The minimum value of instantaneous frequency observed for the given signal is ___ rad/sec.

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: String) 0.3

1 point

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