Unit 10 - Week 5: Wigner-Ville Distributions

Week 5 Assignment

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

Due on 2016-08-29, 23:59 IST

1) *1 point*

1. Select the correct statement with regard to Wigner-Ville distributions:

(a) The WVD may be thought of as the local auto-covariance function of the signal's Fou transform.
(b) The WVD may be thought of as the Fourier transform of a local auto-covariance func
(c) Both (a) and (b).
(d) Neither (a) nor (b).

- a
- b
- c
- d

No, the answer is incorrect.
Score: 0

Accepted Answers:
b

2) *1 point*

2. Which of the following is TRUE regarding WVD?

(a) It assumes real values when the signal is real and complex values when the signal is c
(b) It always assumes complex values regardless of whether signal is real or complex.
(c) It always assumes real values regardless of whether the signal is real or complex.
(d) None of the above.

- a
- b
- c
- d

No, the answer is incorrect.
Score: 0

Accepted Answers:
c

3) *1 point*

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

(a) WVD cannot assume negative values in T-F plane since it is a bilinear distribution.
(b) WVD always satisfies time-frequency marginals.
(c) Any bilinear distribution which satisfies marginal requirements cannot be positive thro the T-F plane.
(d) None of the above

- a
- b
- c
- d

No, the answer is incorrect.
Score: 0

Accepted Answers:
b
c

4) *1 point*

4. Which of the following are correct regarding the global averages computed using W and from the signal?
   (a) $\langle t \rangle^{(WV)} = \langle t \rangle$ (Mean time computed from WVD is same as that of the signal).
   (b) $\langle \omega \rangle^{(WV)} = \langle \omega \rangle$ (Center frequency computed from WVD is same as that of the signal)
   (c) $(\sigma_\omega^2)^{(WV)}(\sigma_t^2)^{(WV)} > \sigma_\omega^2 \sigma_t^2$
   (d) All of the above.

- a
- b
- c
- d

No, the answer is incorrect.
Score: 0

Accepted Answers:
a
b

5) *1 point*

5. Which of the following expressions correctly evaluate instantaneous frequency and g delay using WVD ?
   (a) $\omega_i(t) = \dot{\phi}(t) = \frac{1}{2\pi} \int \omega W(t,\omega) d\omega$
   (b) $\omega_i(t) = \dot{\phi}(t) = \frac{1}{2\pi |x(t)|^2} \int \omega W(t,\omega) d\omega$
   (c) $t_g(\omega) = -\psi'(\omega) = \frac{1}{2\pi} \int t W(t,\omega) dt$
   (d) $t_g(\omega) = -\psi'(\omega) = \frac{1}{|X(\omega)|^2} \int t W(t,\omega) dt$

- a
- b
- c
- d

No, the answer is incorrect.
Score: 0

Accepted Answers:
b
d

6) *1 point*

6. Suppose $W_1(\tau,\xi)$ & $W_2(\tau,\xi)$ are WVD's of the signals $x_1(t) = e^{j\omega_1 t} + e^{j\omega_2 t}$ and $x_2(t) = \sin(\omega_1 t) + \sin(\omega_2 t)$ respectively. Then:
   (a) $W_1(\tau,\xi)$ contains inference terms whereas $W_2(\tau,\xi)$ does not.
   (b) $W_2(\tau,\xi)$ contains inference terms whereas $W_1(\tau,\xi)$ does not.
   (c) Both $W_1(\tau,\xi)$ and $W_2(\tau,\xi)$ contain interference terms.
   (d) Neither of them contains interference terms.

- a
- b
- c
- d

No, the answer is incorrect.
Score: 0

Accepted Answers:
c

7) *1 point*

- a
- b
- c
- d

No, the answer is incorrect.
Score: 0

Accepted Answers:
c
d

8) *1 point*

8. The benefit(s) of Pseudo WVD over WVD is/are:
   (a) It addresses the issue of the non-local nature of the WVD.
   (b) It improves the time-frequency localization.
   (c) The interference terms are eliminated to some extent as a result of smoothing in frequ
   (d) All of the above.

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

No, the answer is incorrect.
Score: 0

Accepted Answers:
a
c

9) *1 point*

9. Which of the following are possible consequences of smoothing WVD ?
   (a) It can enforce positivity.
   (b) It can reduce the interference terms.
   (c) It can reduce the smearing.
   (d) It can preserve the marginality property of WVD.

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

No, the answer is incorrect.
Score: 0

Accepted Answers:
a
b

10) *1 point*

10. Select the correct statement(s) from the following with respect to discrete-WVDs.
   (a) WVD follows same discretization scheme as that of STFT.
   (b) Analytic form of representation reduces the interferences due to aliasing.
   (c) Spectral aliasing can be avoided by adding sufficient zeros at high frequencies.
   (d) None of the above.

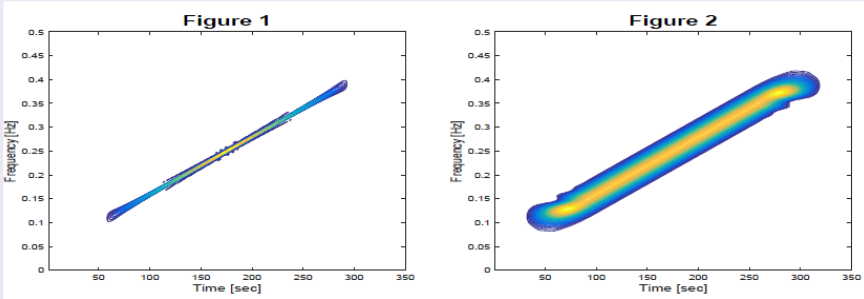
- [ ] a
- [ ] b
- [ ] c
- [ ] d

No, the answer is incorrect.
Score: 0

Accepted Answers:
b
c

11) *1 point*

11. A signal is made up of three segments. The initial segment has a zero activity, the cent segment contains a chirp and the final segment also has zero activity. Two different T-F distributions of the signal are given below. Choose the correct inference(s) from the foll



(a) Figure 1 represents spectrogram while figure 2 represents WVD.
(b) There is some activity in the signal before 50 sec.
(c) The signal activity starts only after 50 sec.
(d) Smearing is more in case of WVD than in spectrogram.

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

No, the answer is incorrect.
Score: 0

Accepted Answers:
c

12)

A multi-component signal is given in the data file `a5_sigData.mat`. Use this dataset t answer the questions **12** to **14**. The answers to these questions are to be filled as an **in**

12. The WVD for the given signal has _____ interference terms.

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: String) 3

1 point

13)

13. The pseudo-WVD for the given signal has _____ interference terms.

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: String) 2

1 point

14)

14. The center frequency corresponding to the highest frequency component present ir signal is f cycles/sample.The value of $10f$ is _____.

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: String) 4

1 point

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