

Pre-quiz:

The following questions will help us evaluate the effectiveness of the J-DSP Ion Channel exercises in teaching signal processing concepts. The questions are related to the concepts used in the exercises.

Please choose the most appropriate answer.

1. Ion-channel signals

- a) Arise from fluctuations in conductance of cell membrane.
- b) Are corrupted by noise during acquisition.
- c) Both (a) and (b).
- d) None of the above.

2. A Low Pass filter

- a) Allows high frequency components and attenuate low frequency components.
- b) Allows low frequency components and attenuate high frequency components.

3. De-noising using low pass filtering leads to

- a) Large dispersion in the signal from its mean.
- b) Small dispersion in the signal from its mean.

4. Which of the following J-DSP functions can be used to characterize signals?

- a) Periodogram
- b) Autocorrelation function.
- c) Only (a).
- d) Both (a) and (b).

4. The power spectrum of white noise

- a) Has more high frequency content.
- b) Has more low frequency content.
- c) Is flat or constant.
- d) None of the above.

5. What is the approximate nature of the J-DSP autocorrelation function when applied to the fluctuations in the membrane conductance?

- a) Sinusoid.
- b) Exponentially decaying.
- c) Exponentially increasing.
- d) None of the above.

6. The Periodogram of all the frames of an ion channel signal are identical.

True/False

7. Corner frequency and state switching frequency of ion-channels are related.

True/False

8. J-DSP is a program that can be used to

- a) Run signal analysis simulations on the web
- b) Calculate correlations and power spectra
- c) Run filtering simulations
- d) All of the above