

Tutorial 1 -- Week 3 : Basic Signal Models

Part I: Reviewing Signal Models

Q1) Determine whether each of the following statements is **true** or **false**. If the statement is false, demonstrate this by proof or example.

- a. Every continuous-time signal is analog signal.
- b. Every discrete-time signal is digital signal.
- c. If a signal is not an energy signal, then it must be a power signal and vice versa.
- d. An energy signal must be of finite duration.
- e. A power signal cannot be causal.
- f. A periodic signal cannot be anticausal.

Q2) Determine the characteristics of the following signals, particularly whether they are:

- * Periodic or non-periodic
- * Even or odd
- * The fundamental frequency (if periodic)

Justify your answers by plotting the signals (either by hand or with MATLAB)

a) $x(t) = je^{(-1+j)t}$

b) $x[n] = \cos(\frac{\pi}{2}n)\cos(\frac{\pi}{4}n)$ *hint: look for a trigonometric identity to help you out!

c) $x[n] = e^{5j(n+1/2)}$

d) $x(t) = \cos^2(2t - \frac{\pi}{3})$

Q3) Using the information you've learned from the lectures (specifically Lecture 3, Slide 25

wink wink), show that:

a) $(t^3 + 3)\delta(t) = 3\delta(t)$

b) $[\sin(t^2 - \frac{\pi}{2})]\delta(t) = -\delta(t)$

where $\delta(t)$ is the unit impulse function.

Part II: Peer Feedback

Using the Assignment 0 [Answer Key](#) and [Rubric](#) along with the [Introduction to Peer Review](#) in Tutorial 0, please work through the peer review process and enter some feedback. Discuss this with your tutorial partner (neighbouring student). If you find any really good (or clever) answers, please let one of the tutors know. Please try to have this finished by **Friday, March 21, 2014**. Thank you!