

Digital Signal Processing 1-1 Quiz

(1) Restate the Shannon-Nyquist Sampling Theorem.

In order for a digitized signal to uniquely represent the pre-digitized signal, the sampling rate must be at least double the highest frequency component present in the data.

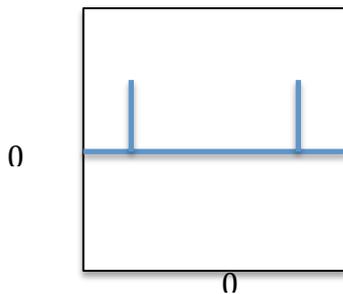
Or some variation thereof.

(2) A signal D is the sum of periodic signals A, B, and C. What must be true of A, B, and C if D is also periodic?

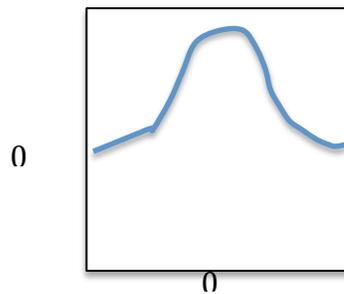
Their periods must have an integer least common multiple.

(3) Draw schematic representations of the Fourier transform amplitude with respect to frequency of a sine wave, a Gaussian function, and a delta function (vertical line). Label the 0-ticks on your axes.

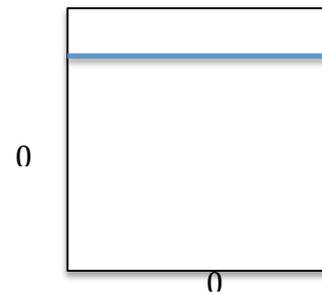
Sine



Guassian



Del ta



(4) What are the trade-offs when using Welch's method?

Reduce variance for reduced spectral resolution.

(bonus) Circle the window functions covered in this lecture

Hamming

Sawtooth

Hamm

Periodic

Hann

Rectangular

Hanning