

Convolution Discussion

Write your answers to the questions in a word document to submit. Let us know if you have questions or we can help in any way.

Question 1) Define superposition.

The ability of a quantum system to be in multiple states at the same time until it is measured.

Recall from the previous lab that the gain $b_0 = h[0]$, the gain $b_1 = h[1]$, and the gain $b_2 = h[2]$ where $h[n]$ is the unit pulse response. This means that each of the gains affected an individual output period. Based on the convolution formula (1) below, formulas (2), (3), and (4) can be found.

$$y[n] = x[n] * h[n] = \sum_{k=-\infty}^{\infty} x(k) \cdot h(n-k) \quad (1)$$

$$y[2] = h[0] \cdot x[2] + h[1] \cdot x[1] + h[2] \cdot x[0] \quad (2)$$

$$y[3] = h[0] \cdot x[3] + h[1] \cdot x[2] + h[2] \cdot x[1] \quad (3)$$

$$y[4] = h[0] \cdot x[4] + h[1] \cdot x[3] + h[2] \cdot x[2] \quad (4)$$

Question 2) If n goes from 0 to 5, write the equations for $y[0]$, $y[1]$, and $y[5]$.

Question 3) If I convolve an impulse function (delta function) with anything, what is the result? Why is this the result?

Question 4) Using Google or the Matlab tutorial windows, find how to convolve two signals in Matlab.

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%Jacob Howard
clc; clear;

x=[1 2 3 4];
h=[1 1 2 1];

y=conv(x,h)
```

These will be due by the start of your Convolution TIMS Wk 2 Lab. Please email your responses to your TA by then and have access to a copy of your responses at lab time to allow for a class discussion.

This will count as a week's lab grade.