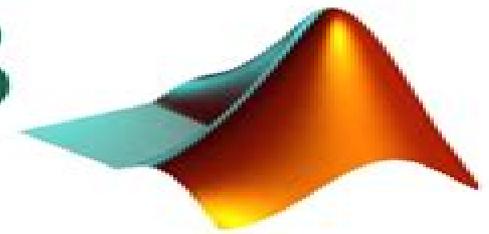


MATLAB

Homework Helper



Problem

Problem 1:

- (a) Plot the result of convolving a one-dimensional function consisting of three impulses with a triangular function as shown below:



- (b) Plot the result of convolving a one-dimensional function consisting of a rectangular function with the same triangular function used in part(a), as shown below:



- (c) Plot the result of convolving a pair of identical even "top-hat" (pulse) functions: $f(t) = 1$ for $|t| < T/2$ and $f(t) = 0$ otherwise. Use your result show that the Fourier transform of a triangular pulse (such as used in parts (a) and (b)) is of the form $(\sin(x)/x)^2$.

Problem 2: Show that when two gaussian functions

$$f_1(x) = e^{-ax^2}$$
$$f_2(x) = e^{-bx^2}$$

are convolved, the result is another gaussian function.

Hint: Complete the square in the exponent, change the variable of integration, and recognize that

$$\int_{-\infty}^{\infty} e^{-x^2} dx = \sqrt{\pi}$$

Matlab Homework Solutions

Michal Rosen-Zvi



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