ECE 460

**Homework 1**

Due in class, Sept. 20

1. Find an expression for the convolution of an arbitrary function, f, with a complex exponential, .
2. Show that, if , then





1. Compute the following convolution operation



1. Solve the 2D diffusion equation in the spatiotemporal frequency domain, i.e., find  for



1. Find the relationship between the autocorrelations of the input  and that of the output, , if *s* and *x* satisfy
   1. 
   2. 
   3. 

Assume *s* and *x* are wide-sense stationary signals.

1. Find the impulse responses associated with the following transfer functions
   1. 
   2. 
   3. 