

# CS474/674 Image Processing and Interpretation

## Homework 2

Due Date: N/A

1. Find the FT of the function  $f(x) = e^{-\pi x^2}$
2. Problem 4.18 (page 306)
3. Problem 4.19 (page 306)
4. Find the DFT and plot the DFT spectrum (i.e., magnitude) of the discrete signal  $h(n)$  defined as follows:  $h(n)=1$  for  $n=0,1,2,3,4$  and  $h(n)=0$  otherwise.
5. A real function  $f(x)$  can be decomposed as the sum of an even function and an odd function:
  - (a) Show that  $f_{\text{even}}(x)=1/2[f(x)+f(-x)]$  and  $f_{\text{odd}}(x)=1/2[f(x)-f(-x)]$
  - (b) Show that  $F[f_{\text{even}}(x)]=\text{Re}\{F[f(x)]\}$  and  $F[f_{\text{odd}}(x)]=j\text{Im}\{F[f(x)]\}$