

CS474/674 Image Processing and Interpretation

Fall 2009 – Dr. George Bebis

Homework 2

Due Date: 9/29/2009

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. **(Graduate Students Only)** 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 $F[f_{\text{odd}}(x)]=j\text{Im}\{F[f(x)]\}$