King Fahd University of Petroleum & Minerals
Department of Electrical Engineering
EE 207 – Signals and Systems
Term 061
Project No. 1 (5%)

Due December 4, 2006

Student Name : _____

Student Number : _____

Section #: _____

1) Study the Matlab program of Example 2.8 (pages 64-67). The program convolves two signals and plots both of them with their convolution.

Write a similar Matlab program to convolve the signals

$$x(t) = \prod\left[\frac{t-1}{2}\right]$$

and

$$h(t) = e^{-0.5t}u(t)$$

Use $0 \le t \le 4$, $\Delta t = 0.005$

a) Plot the two signals x(t) and h(t) along with the result of the convolution y(t). Use the subplot capability of Matlab. Notice that y(t) will have more time values than either x(t) or h(t).
b) Analytically calculate the convolution (theoretical results) and sketch it.
c) Compare the results
(Some useful Matlab functions: ***pls_fn, exp,*** **conv,** ***subplot, plot, xlabel, ylabel, axis***)

2) **Write a Matlab program to examine the effect of the width of a cosine pulse on its spectrum.**
a) Generate the cosine pulse

$$x(t) = \prod(at)\cos(50\pi t)$$

where $-1 \le t \le 1$, for two cases
i) a=1
ii) a=5
For each case:
b) Generate the Fourier transform for x(t) using the Matlab function ***fft.***
c) Apply the Matlab function ***fftshift*** to center the Fourier spectrum obtained in (b).
d) Use the Matlab function ***abs*** to obtain the magnitude of the Fourier spectrum.
d) Use the Matlab function ***angle*** to obtain the phase of the Fourier spectrum.
e) Plot the signal x(t), its magnitude spectrum, and its phase spectrum. Use the subplot capability of Matlab.
f) Compare and comment on the two cases.

Note: the ***pls_fn*** is defined in textbook page 32.

Use this page as a cover sheet for your submitted project.