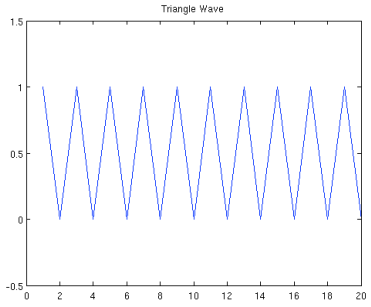
Assignment 1

for NeuroComputing/ Theoretical Neuroscience 2013

a. Write a program that multiplies two random matrices of rank 1000. This program should use two different implementations. In you should use the Matlab implementation with the operator `*', and in the other you should use explicit loops to calculate the resulting matrix (explicit component wise). Your program should report the elapsed time for both methods by using the Matlab commands **tic** and **toc**. (3 points)

b. Write a Matlab program to plot the graph below (2 points)



c. Modify the simulation program for a synapse (program EPSP.m) to show the time course of the EPSP when the synapse is stimulated with neuro-transmitters every 20 ms. (2 points)

d. Given is the following ODE: $\tau\, dx/dt = -x$ with initial condition $x(0)=1$ and time constant $\tau=5$. Write a program that plots the difference between the analytic solution and the numerical solutions using the Euler method and the Runge-Kutta method (function ode45 in Matlab). (3 points)

To submit your assignments, send four Matlab programs as attachments to prof6508@cs.dal.ca. Assignments must be received by Thursday, Jan 24.