**Project 2**

1. Two neuronal models represented as and are coupled using K. Using ode45, solve the following models and find the critical value of K such that these two neurons are synchronized (spiking together) :

Given , , and . Use the initial conditions,

, ,

, ,

Plot

(i) and with K=0

(ii) and with K at the critical value where these two outputs are synchronized

1. Given a 40 seconds segment of EEG in testEEG.txt and also shown in figure below, Divide the given eeg segments equally in 8 segments, each segment being 5 seconds of duration and calculate the FFT of each of the segment. Find the maximum amplitude in each of the segment and the corresponding frequency. Plot (a) maximum amplitude vs window number and (b) frequency vs window number. Sampling frequency is 128Hz.



The data is segmented manually and each section it is done coding individually

My fft function:

function [P1,f]= myfft(data,Fs)

% setting the parameters,Sampling frequency, Length of signal,Sampling period, Time vector

Y=fft(data);

L=length(data);

f = Fs\*(0:(L/2))/L;

% Function

P2 = abs(Y/L);

P1 = P2(1:L/2+1);

P1(2:end-1) = 2\*P1(2:end-1);

end

main coding

clear all

close all

clc

eeg = load('testEEG1.txt');% give each time file for each segment

plot(eeg)

%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

fs=10000;

[P,f]=myfft(eeg,fs);

figure()

plot(f,P)

%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

Segment 1

|  |  |
| --- | --- |
|  |  |

203.125 and 10.9502

Segment 2

|  |  |
| --- | --- |
|  |  |

218.75 and 18.3591

Segment 3

|  |  |
| --- | --- |
|  |  |

234.375 and 39.6866

Segment 4

|  |  |
| --- | --- |
|  |  |

191.7808 and 16.171

Segment 5

|  |  |
| --- | --- |
|  |  |

218.75 and 19.6998

Segment 6

|  |  |
| --- | --- |
|  |  |

187.5 and 12.5885

Segment 7

|  |  |
| --- | --- |
|  |  |

203.4429 and 9.6141

Segment 8

|  |  |
| --- | --- |
|  |  |

1370.7165 and 7.2099