% This functions computes the average power spectrum with a

% window length L = 1000

% spec input arguments:

% x = time signal to compute the average power spectrum;

% sf = sampling frequency;

% mif = lower limit of frequency to be plotted;

% maf = upper limit of frequency to be plotted;

% flag = 1 if the figure should be displayed;

% 0 if the figure should not be displayed;

% nameplot = string with the title of the plot;

function [afr,aco]=specL(x,sf,mif,maf,L,flag,nameplot)

[nChan T] = size(x);

if nChan<T

x = x';

end

%L=1000;

lx=length(x);sp1=zeros(L,1);

if mod(lx,L) == 0

lx = lx;

else

lx = lx - mod(lx,L);

end

m=0;

for i=1:L:lx

m=m+1;

x1=x(i:i+L-1,1);

x1=(x1-mean(x1));%/std(x1);

f1=fft(x1)/length(x1);

p1=f1.\*conj(f1);

sp1=sp1+p1;

end

sp1=sp1/m;

fr=(0:L-1)/L\*sf;

q1=find(fr>=mif);

q2=find(fr>=maf);

aco=sp1(q1(1):q2(1));

afr=fr(q1(1):q2(1));

cf=0.01^(1/(m-1));% sinignificance of zero coherence

con\_lim=(1-cf);

% disp('Take down the confidence limit')

% disp(con\_lim)

if(flag)

figure; plot(afr,10\*log10(aco)); title([nameplot],'FontSize',14,'FontWeight','Bold')

xlabel('Frequency (Hz)'); ylabel('PSD (dB)')

end