eeg2\_tr=trial7.eeg1;

emg2\_tr=trial7.eeg7;

eeg2\_tr=eeg2\_tr\*(3.3/4096);

emg2\_tr=emg2\_tr\*(3.3/4096);

f\_data2=length(emg2\_tr)/120;

t\_data2=1/f\_data2;

Time\_d2=[0:1:length(eeg2\_tr)-1]\*t\_data2;

plot(Time\_d2,eeg2\_tr)

title('eeg data')

xlabel('Time(s)')

ylabel('Voltage(v)')

plot(Time\_d2,emg2\_tr)

title('emg data')

xlabel('Time(s)')

ylabel('Voltage(v)')

eeg2\_tr\_fft=fft(eeg2\_tr);

eeg2\_tr\_fft(1)=0;

eeg2\_tr=ifft(eeg2\_tr\_fft);

plot(Time\_d2,eeg2\_tr)

title('eeg data')

xlabel('Time(s)')

ylabel('Voltage(v)')

emg2\_tr\_fft=fft(emg2\_tr);

emg2\_tr\_fft(1)=0;

emg2\_tr=ifft(emg2\_tr\_fft);

plot(Time\_d2,emg2\_tr)

title('emg data')

xlabel('Time(s)')

ylabel('Voltage(v)')

pspectrum(emg2\_tr,f\_data2,"spectrogram","FrequencyLimits",[0,15],"MinThreshold",-60,"OverlapPercent",90,"TimeResolution",1.8);

pspectrum(eeg2\_tr,f\_data2,"spectrogram","FrequencyLimits",[0,15],"MinThreshold",-60,"OverlapPercent",90,"TimeResolution",1.8);

% Smooth input data

emg\_smooth2 = smoothdata(emg2\_tr,"movmean",[3 2]);

% Display results

clf

plot(emg2\_tr,"Color",[77 190 238]/255,"DisplayName","Input data")

hold on

plot(emg\_smooth2,"Color",[0 114 189]/255,"LineWidth",1.5,...

"DisplayName","Smoothed data")

hold off

legend

% Smooth input data

eeg\_smooth2 = smoothdata(eeg2\_tr,"movmean",[4 1]);

% Display results

clf

plot(eeg2\_tr,"Color",[77 190 238]/255,"DisplayName","Input data")

hold on

plot(eeg\_smooth2,"Color",[0 114 189]/255,"LineWidth",1.5,...

"DisplayName","Smoothed data")

hold off

legend

% Remove trend from data

eeg\_smooth2 = detrend(eeg\_smooth2);

% Display results

clf

plot(eeg\_smooth2,"Color",[77 190 238]/255,"DisplayName","Input data")

hold on

plot(eeg\_smooth2,"Color",[0 114 189]/255,"LineWidth",1.5,...

"DisplayName","Detrended data")

plot(eeg\_smooth2-eeg\_smooth2,"Color",[217 83 25]/255,"LineWidth",1,...

"DisplayName","Trend")

hold off

legend

% Remove trend from data

emg\_smooth2 = detrend(emg\_smooth2);

% Display results

clf

plot(emg\_smooth2,"Color",[77 190 238]/255,"DisplayName","Input data")

hold on

plot(emg\_smooth2,"Color",[0 114 189]/255,"LineWidth",1.5,...

"DisplayName","Detrended data")

plot(emg\_smooth2-emg\_smooth2,"Color",[217 83 25]/255,"LineWidth",1,...

"DisplayName","Trend")

hold off

legend

pspectrum(eeg\_smooth2,f\_data2,"power","FrequencyLimits",[0,10])%"FrequencyLimits",[0,15],"MinThreshold",-40,"OverlapPercent",90,"TimeResolution",1);

pspectrum(emg\_smooth2,f\_data2,"spectrogram","FrequencyLimits",[0,15],"MinThreshold",-65,"OverlapPercent",99,"TimeResolution",1);

pspectrum(eeg\_smooth2,f\_data2,"spectrogram","FrequencyLimits",[0,15],"MinThreshold",-60,"OverlapPercent",99,"TimeResolution",1);

pspectrum(emg\_smooth2,f\_data2,"power","FrequencyLimits",[0,10])

[correlated\_eeg\_emg2,lags2]=xcorr(eeg\_smooth2,emg\_smooth2);

plot(lags2,correlated\_eeg\_emg2);

output\_eeg\_emg\_7=[eeg2\_tr,emg2\_tr];

output\_eeg\_emg\_7\_smooth=[eeg\_smooth2,emg\_smooth2];

writematrix(output\_eeg\_emg\_7\_smooth,'D:\matlab\ymaps\_code\data\output\_eeg\_emg\_7\_smooth.csv');

writematrix(output\_eeg\_emg\_7,'D:\matlab\ymaps\_code\data\output\_eeg\_emg\_7.csv');

figure;

windowsize=288

for i=1:windowsize:length(eeg\_smooth2)-windowsize

eeg\_smooth2\_seg=eeg\_smooth2(i:i+windowsize-1);

% [p\_seg,f\_Seg,t\_seg]=pspectrum(eeg\_smooth2\_seg,f\_data2,"power");

% plot(f\_Seg,10\*log(p\_seg));

% xlim([0,40]);

%

[p\_seg,f\_Seg,t\_seg]=pspectrum(eeg\_smooth2\_seg,f\_data2,"spectrogram","FrequencyLimits",[0,20]);

view([-52.98308 53.48453])

% aterfall(t\_seg,f\_Seg,p\_seg)

% Create waterfall of t\_seg, f\_Seg, and p\_seg

p = waterfall(t\_seg,f\_Seg,p\_seg,p\_seg);

% Add xlabel, ylabel, zlabel, and title

xlabel('t\_seg')

ylabel('f\_Seg')

zlabel('p\_seg')

title('t\_seg vs. f\_Seg vs. p\_seg')

title(sprintf('Power spectrum at t=%.2f seconds',i/f\_data2));

pause(1/1200);

end