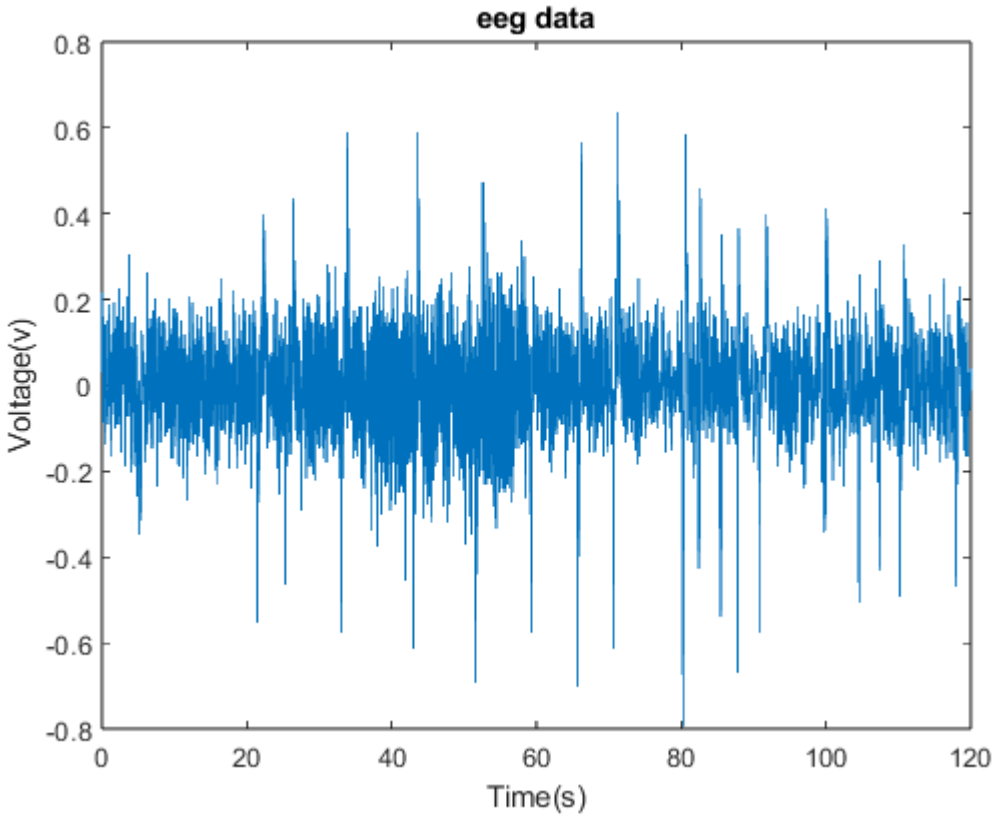
```
data_test_eeg1=trial2.eeg1;
data_test_emg1=trial2.emg7;
data_test_eeg1=data_test_eeg1*(3.3/4096);
data_test_emg1=data_test_emg1*(3.3/4096);
Fr_data=length(data_test_emg1)/120;
ti_data=1/Fr_data;
T_data1=[0:1:(length(data_test_eeg1)-1)]*ti_data;

data_test_eeg1_fft=fft(data_test_eeg1);
data_test_eeg1_fft(1)=0;
data_test_eeg1=ifft(data_test_eeg1_fft);
plot(T_data1,data_test_eeg1)
title('eeg data')
xlabel('Time(s)')
ylabel('Voltage(v)')
```

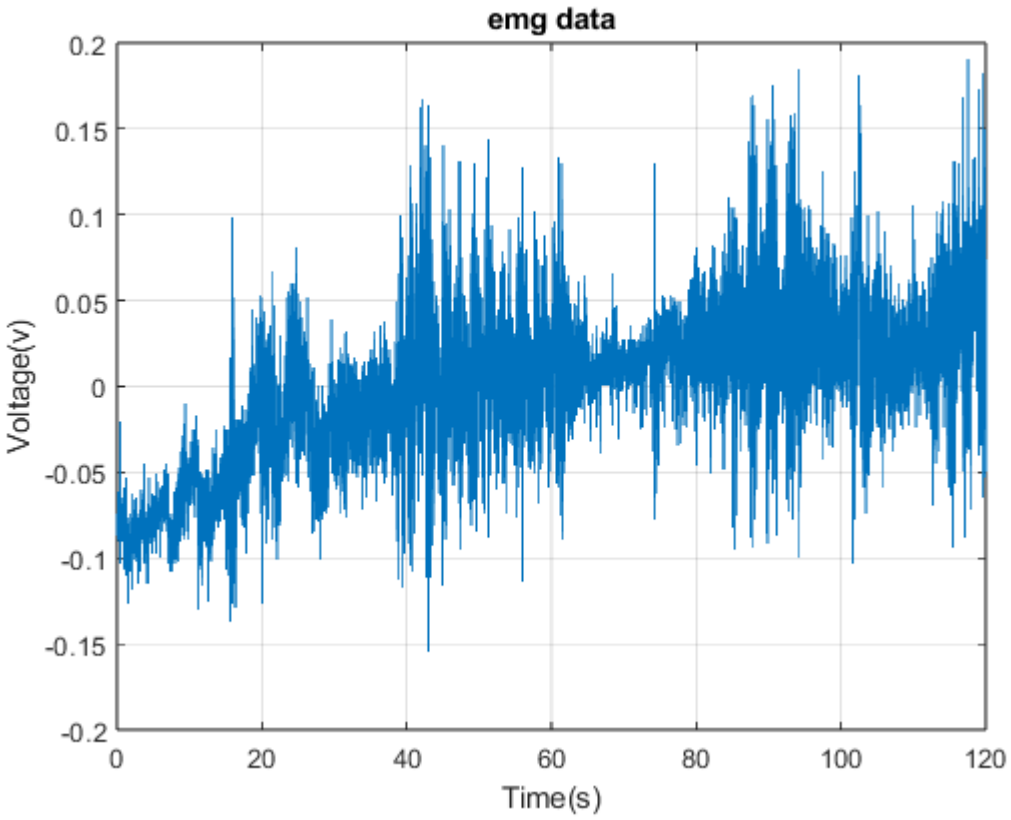



```
data_test_emg1_fft=fft(data_test_emg1);
data_test_emg1_fft(1)=0;
data_test_emg1=ifft(data_test_emg1_fft)
```

```
data_test_emg1 = 16067×1
   -0.0742
   -0.0766
   -0.0863
   -0.0774
   -0.0742
```

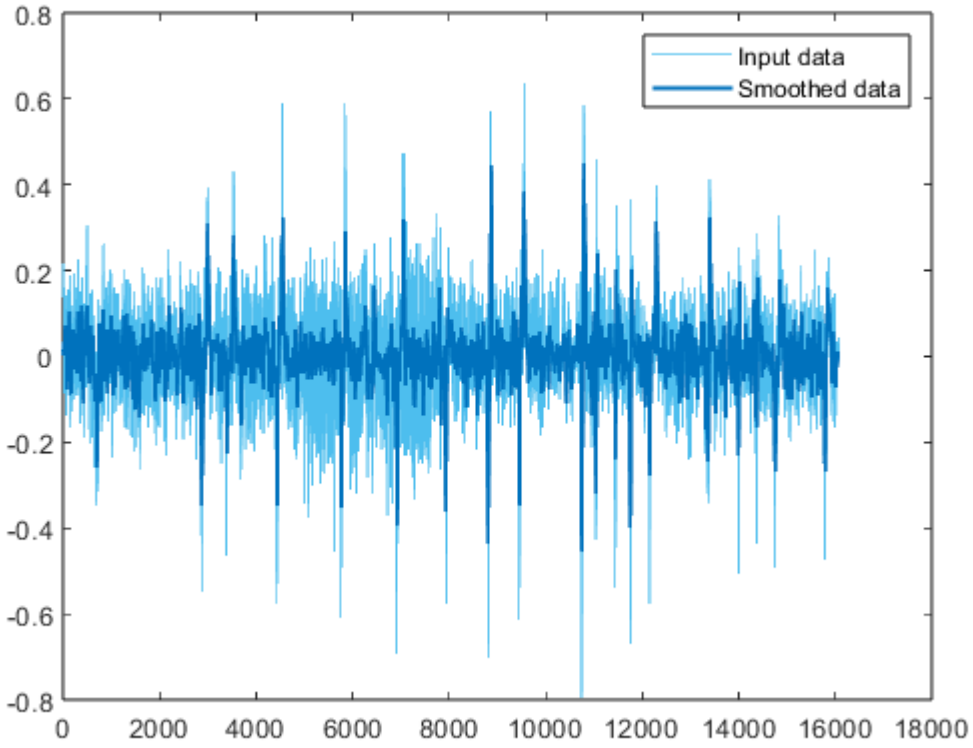
```
   -0.0790
   -0.0806
   -0.0766
   -0.0814
   -0.0847
     ⋮
     ⋮
```

```
plot(T_data1,data_test_emg1)
grid on
xlim('auto')
ylim('auto')
title('emg data')
xlabel('Time(s)')
ylabel('Voltage(v)')
```

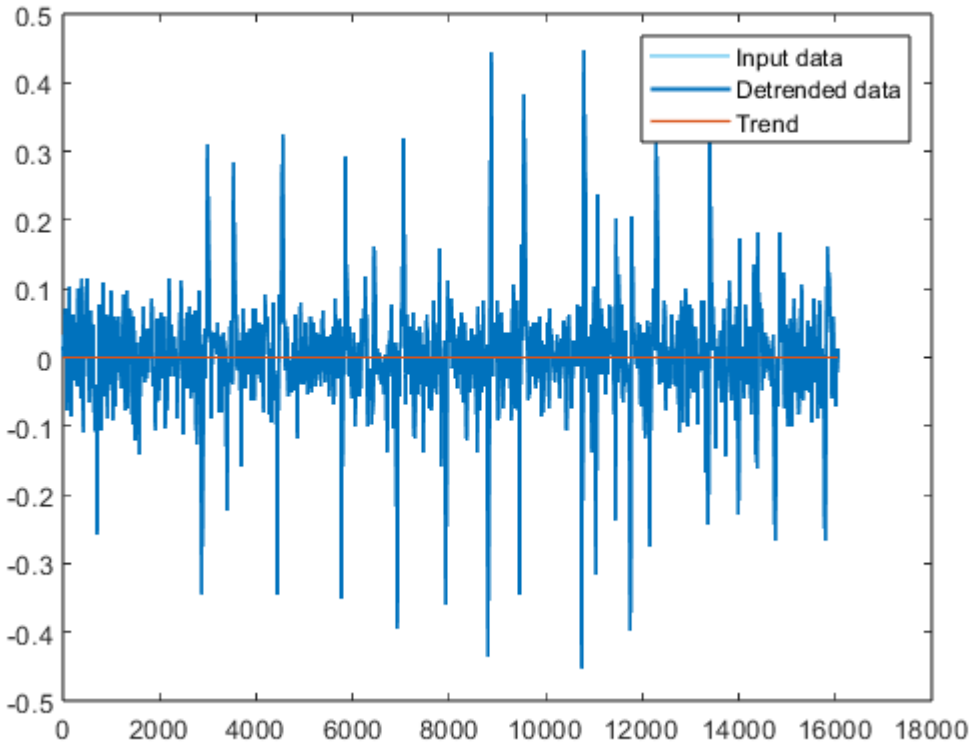



```
%smooth eeg data
% Smooth input data
smoothedData_1 = smoothdata(data_test_eeg1,"movmean","SmoothingFactor",0.5);

% Display results
clf
plot(data_test_eeg1,"Color",[77 190 238]/255,"DisplayName","Input data")
hold on
plot(smoothedData_1,"Color",[0 114 189]/255,"LineWidth",1.5,...
    "DisplayName","Smoothed data")
hold off
```

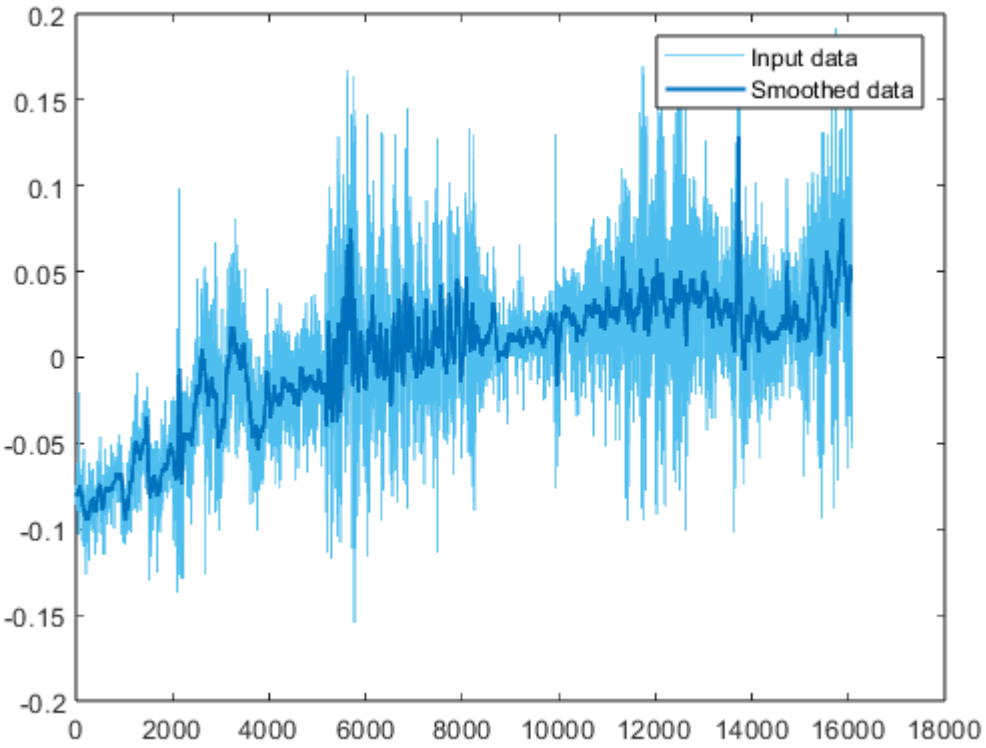
```
legend
```



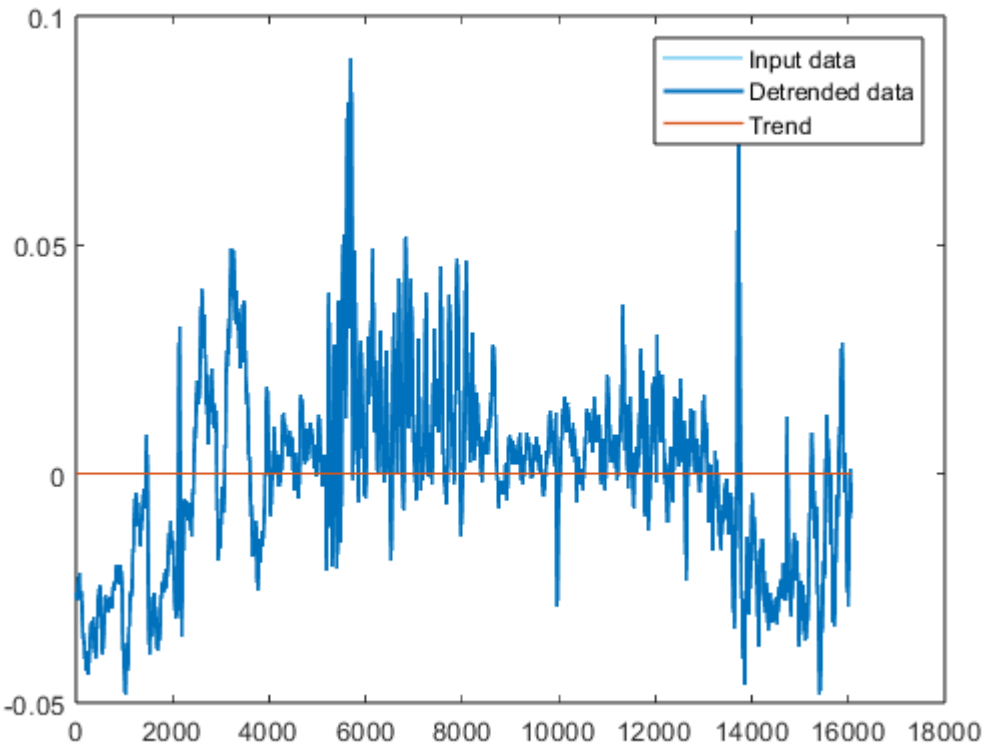

```
%detrended eeg data
% Remove trend from data
smoothedData_1 = detrend(smoothedData_1);

% Display results
clf
plot(smoothedData_1,"Color",[77 190 238]/255,"DisplayName","Input data")
hold on
plot(smoothedData_1,"Color",[0 114 189]/255,"LineWidth",1.5,...
    "DisplayName","Detrended data")
plot(smoothedData_1-smoothedData_1,"Color",[217 83 25]/255,"LineWidth",1,...
    "DisplayName","Trend")
hold off
legend
```



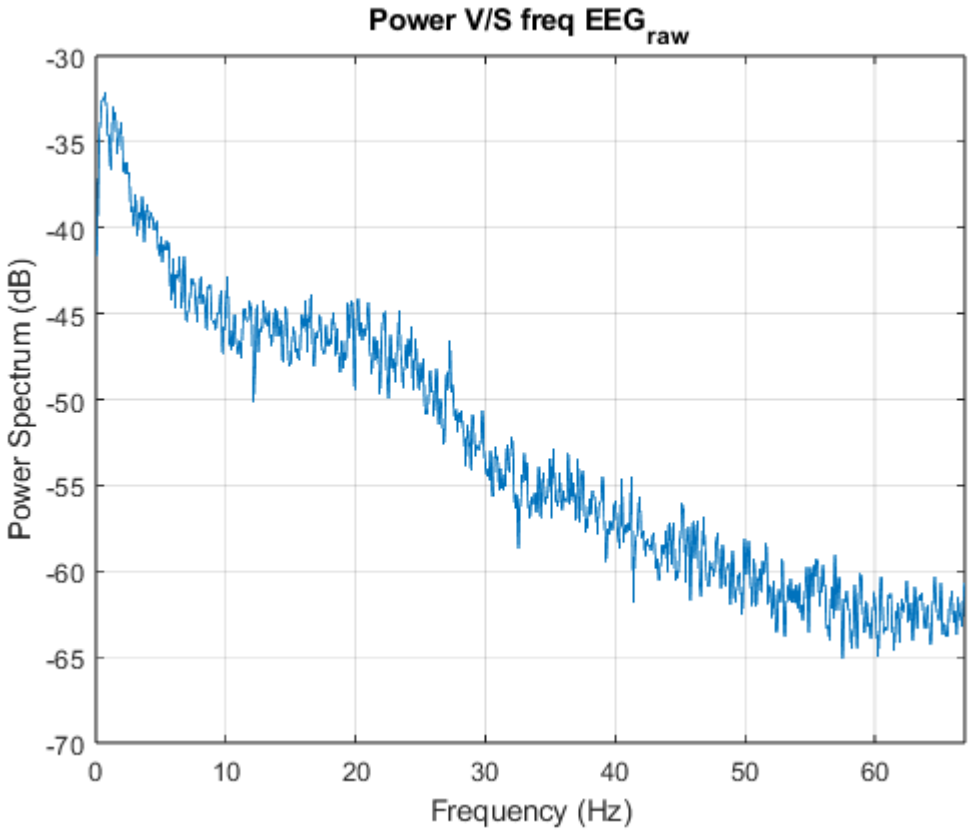

```
%smooth emg data
% Smooth input data
smoothedData_5 = smoothdata(data_test_emg1,"movmean","SmoothingFactor",0.3);

% Display results
clf
plot(data_test_emg1,"Color",[77 190 238]/255,"DisplayName","Input data")
hold on
plot(smoothedData_5,"Color",[0 114 189]/255,"LineWidth",1.5,...
    "DisplayName","Smoothed data")
hold off
legend
```



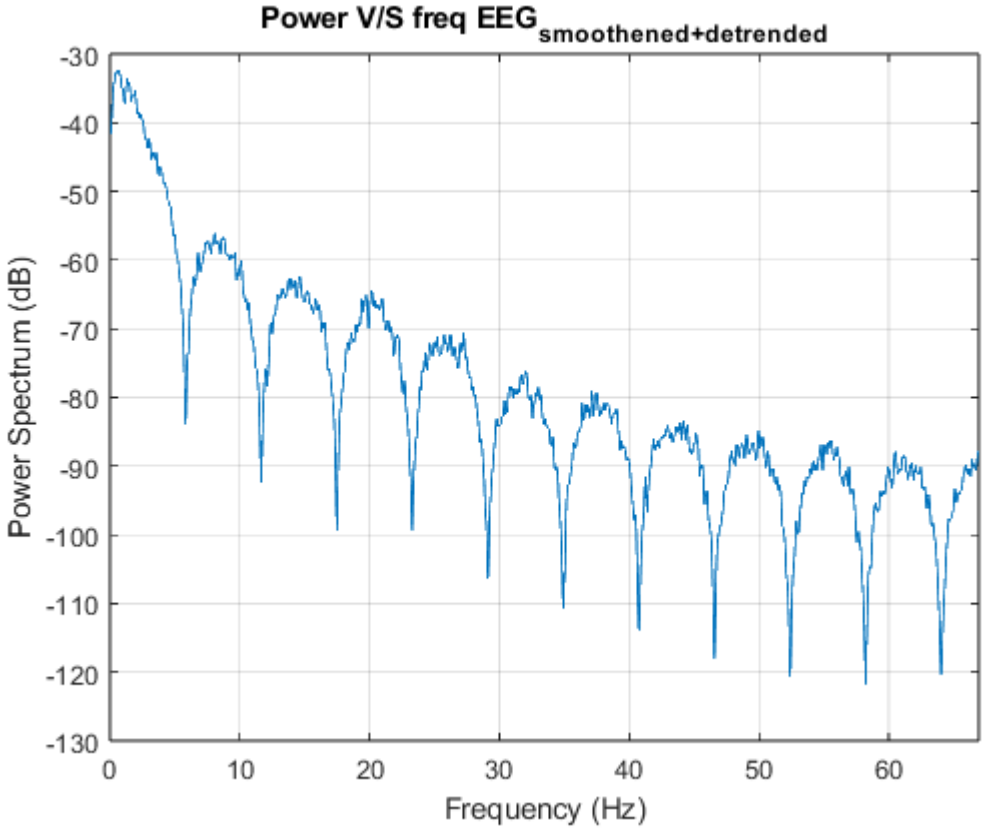

```
%detrended emg data
% Remove trend from data
smoothedData_5 = detrend(smoothedData_5);

% Display results
clf
plot(smoothedData_5,"Color",[77 190 238]/255,"DisplayName","Input data")
hold on
plot(smoothedData_5,"Color",[0 114 189]/255,"LineWidth",1.5,...
    "DisplayName","Detrended data")
plot(smoothedData_5-smoothedData_5,"Color",[217 83 25]/255,"LineWidth",1,...
    "DisplayName","Trend")
hold off
legend
```



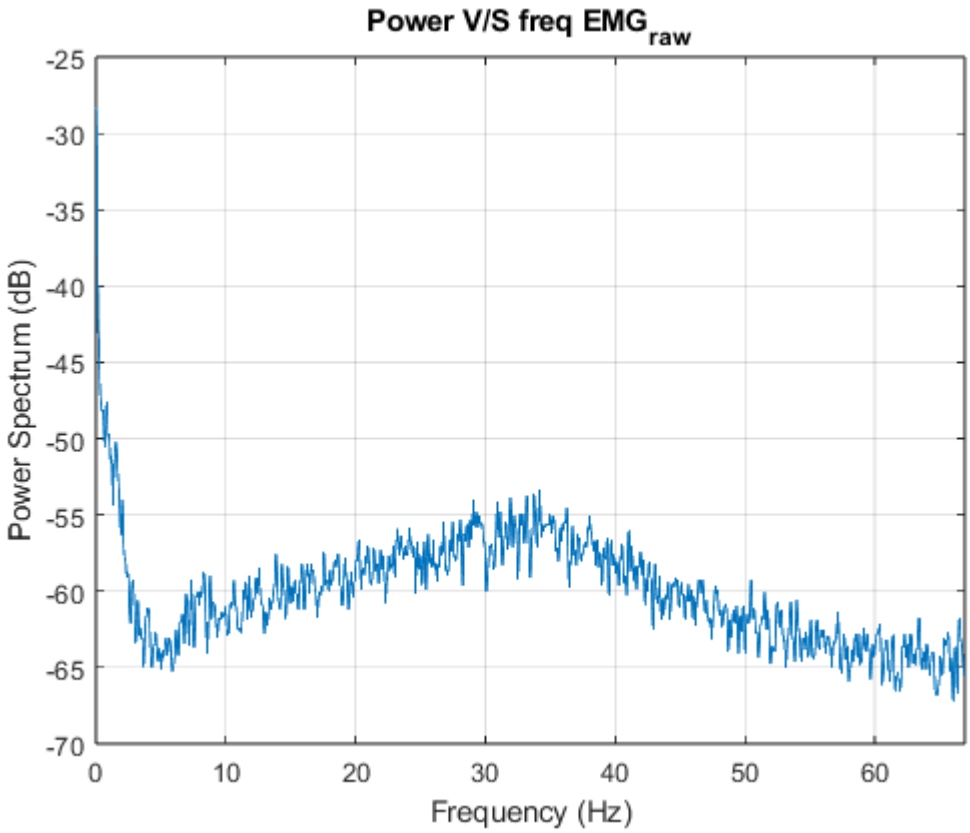

```
pspectrum(data_test_eeg1,Fr_data,"power")
title('Power V/S freq EEG_r_a_w')
```



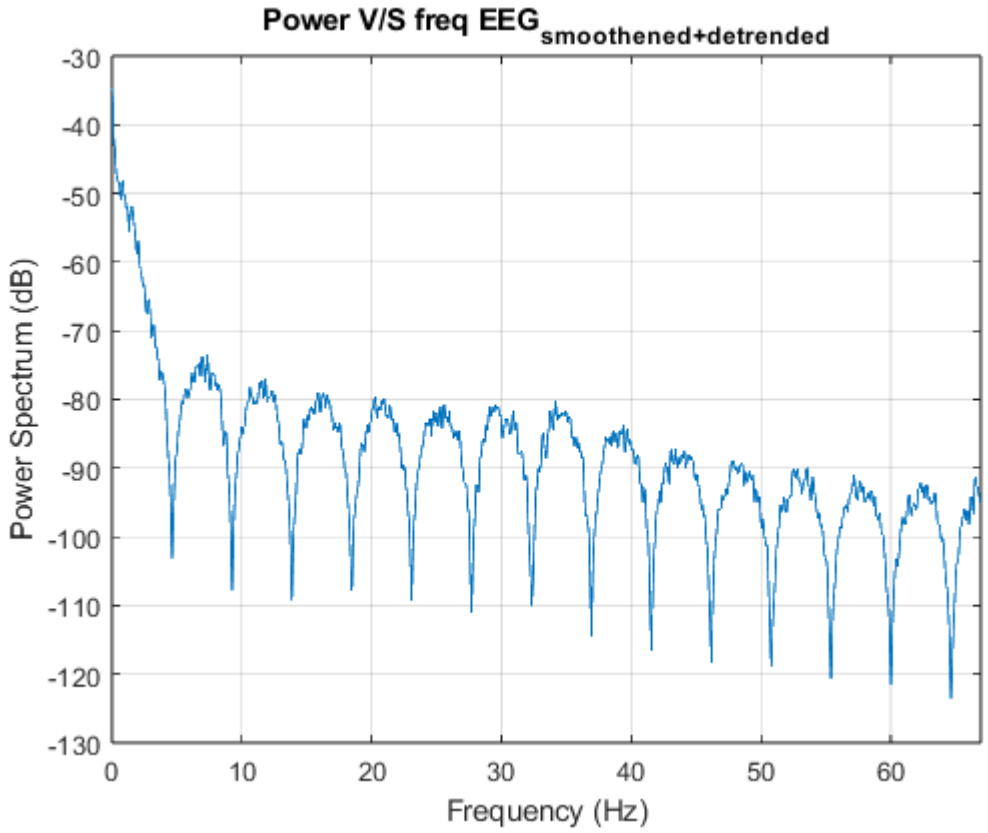

```
pspectrum(smoothedData_1,Fr_data,"power")
title('Power V/S freq EEG_s_m_o_o_t_h_e_n_e_d_+_d_e_t_r_e_n_d_e_d')
```



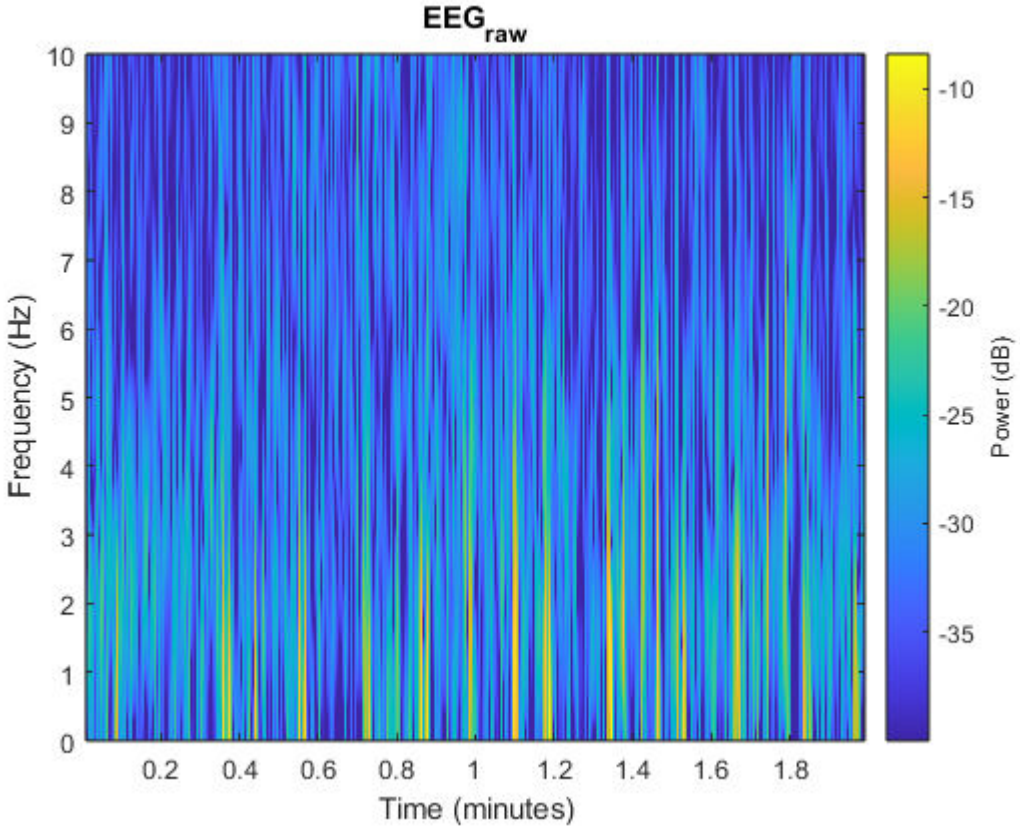
```
pspectrum(data_test_emg1,Fr_data,"power")
title('Power V/S freq EMG_r_a_w')
```



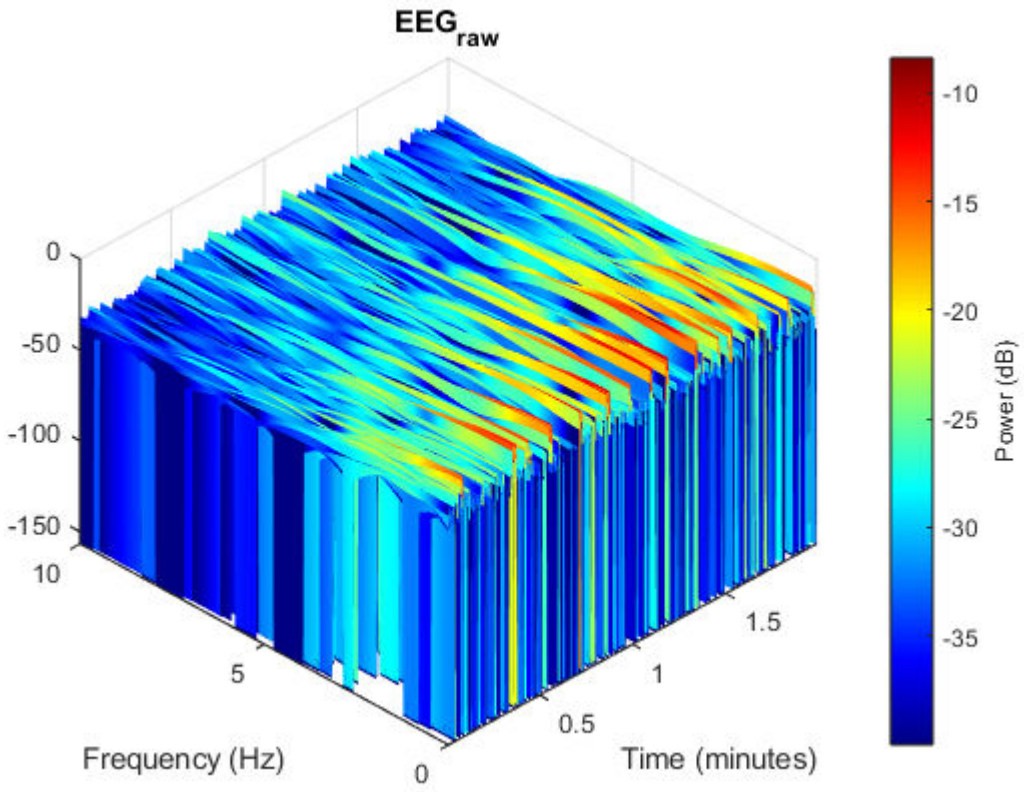

```
pspectrum(smoothedData_5,Fr_data,"power")
title('Power V/S freq EEG_s_m_o_o_t_h_e_n_e_d_+_d_e_t_r_e_n_d_e_d')
```




```
pspectrum(data_test_eeg1*1,Fr_data,"spectrogram",'MinThreshold',-40,"TimeResolution",1.3,"Frequ
title('EEG_r_a_w')
```

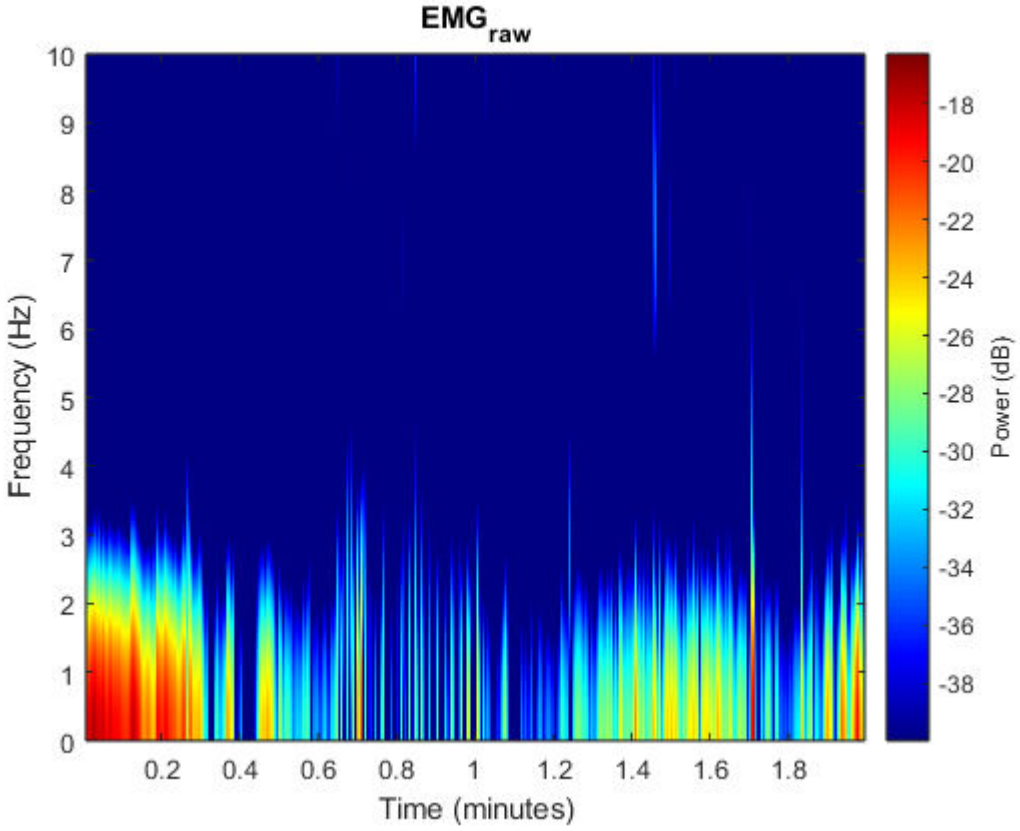



```
view(-45,45)
colormap jet
title('EEG_r_a_w')
```



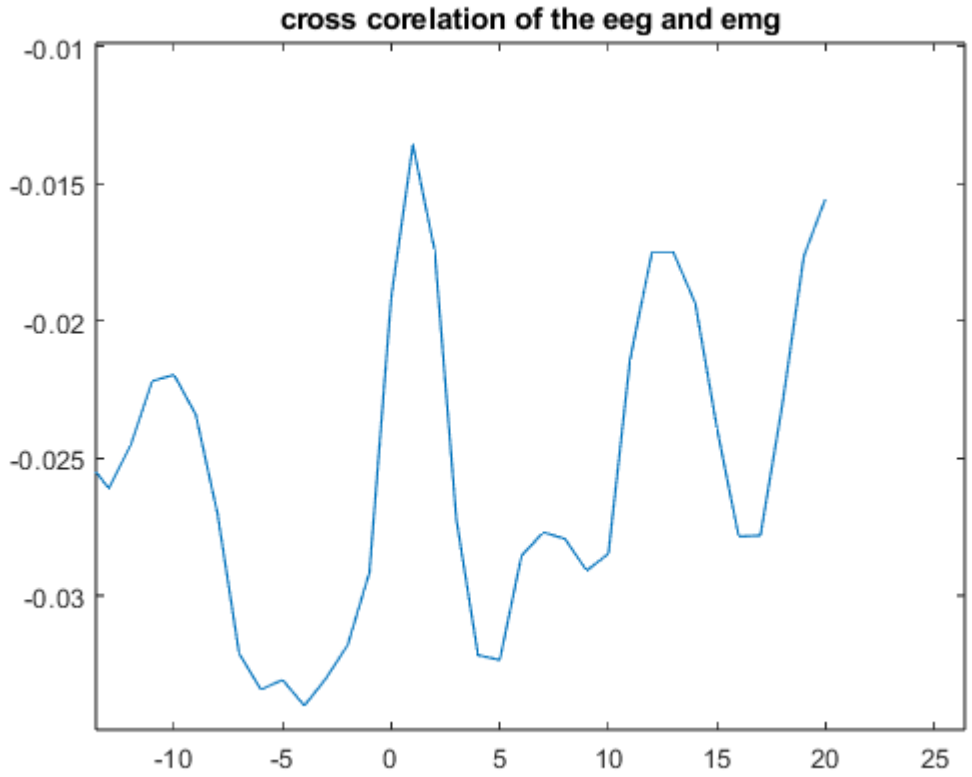

```
%pspectrum(data_test_eeg1*1,Fr_data,"spectrogram",'MinThreshold',-40,"TimeResolution",1.3,"Fre
```

```
%colormap jet;
pspectrum(data_test_emg1*1,Fr_data,"spectrogram",'MinThreshold',-40,"TimeResolution",1,"Frequen
title('EMG_r_a_w')
```

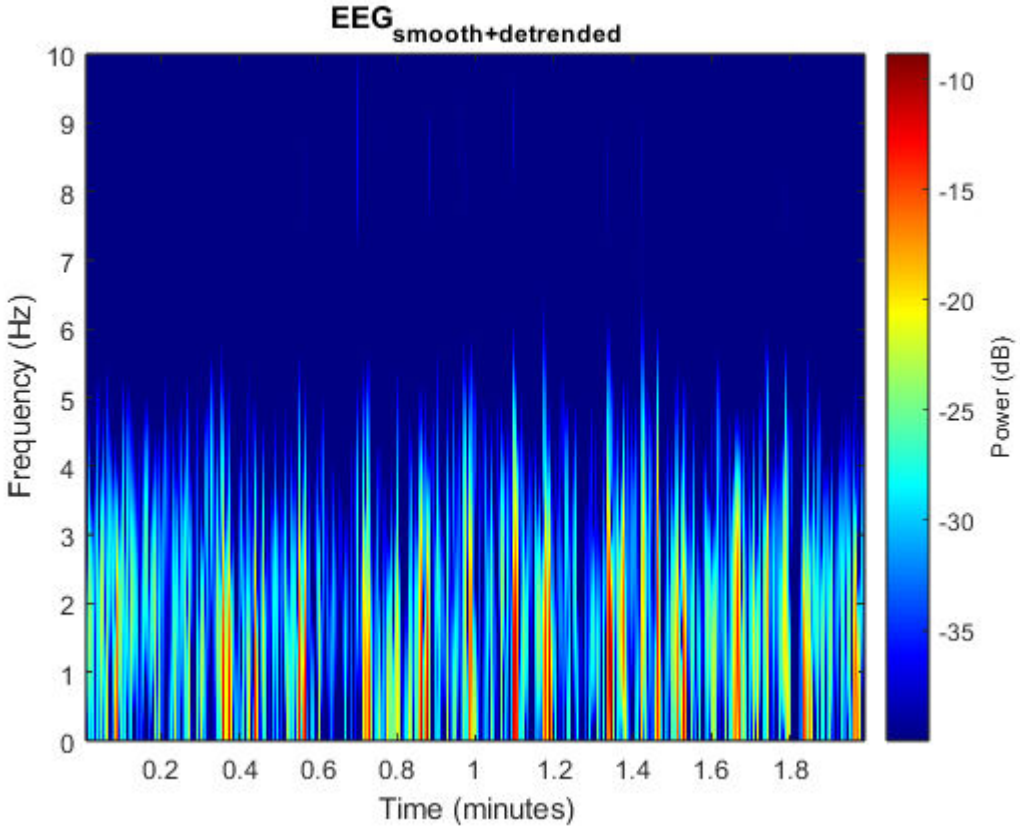



```
[eeg1corr,lagscorr1]=crosscorr(data_test_eeg1,data_test_emg1);
```

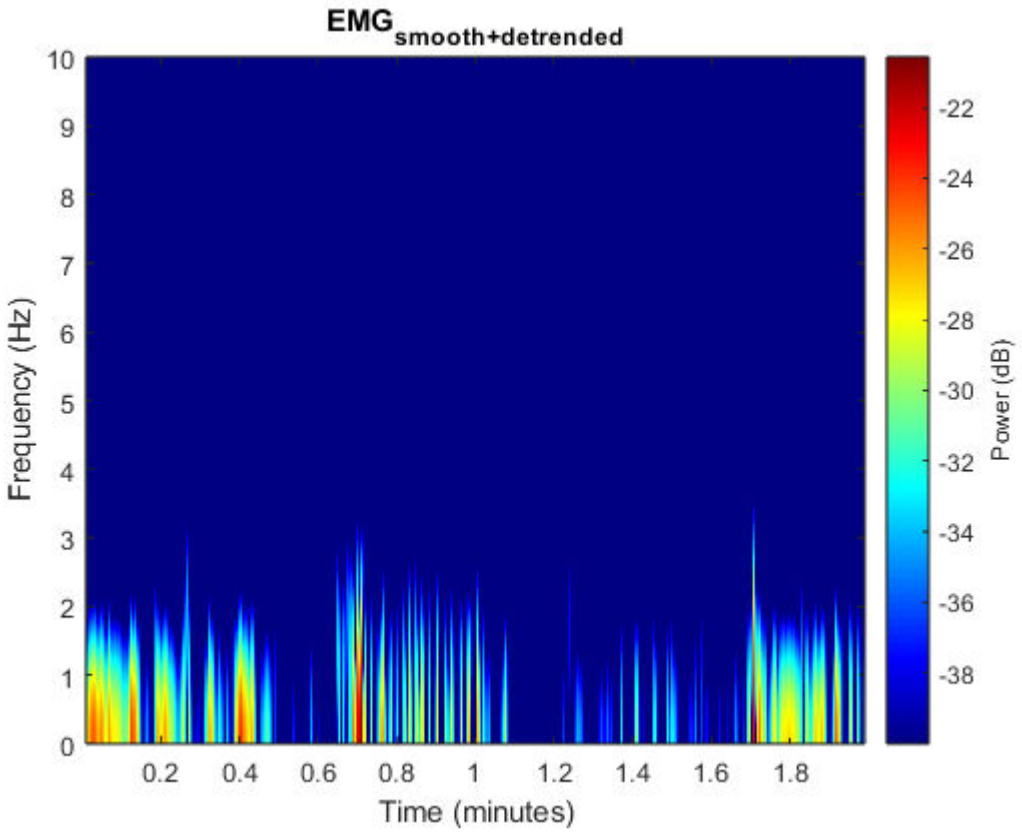
```
plot(lagscorr1,eeg1corr)
title('cross corelation of the eeg and emg')
```




```
pspectrum(smoothedData_1*1,Fr_data,"spectrogram",'MinThreshold',-40,"TimeResolution",1.3,"Frequ
title('EEG_s_m_o_o_t_h_+_d_e_t_r_e_n_d_e_d')
```

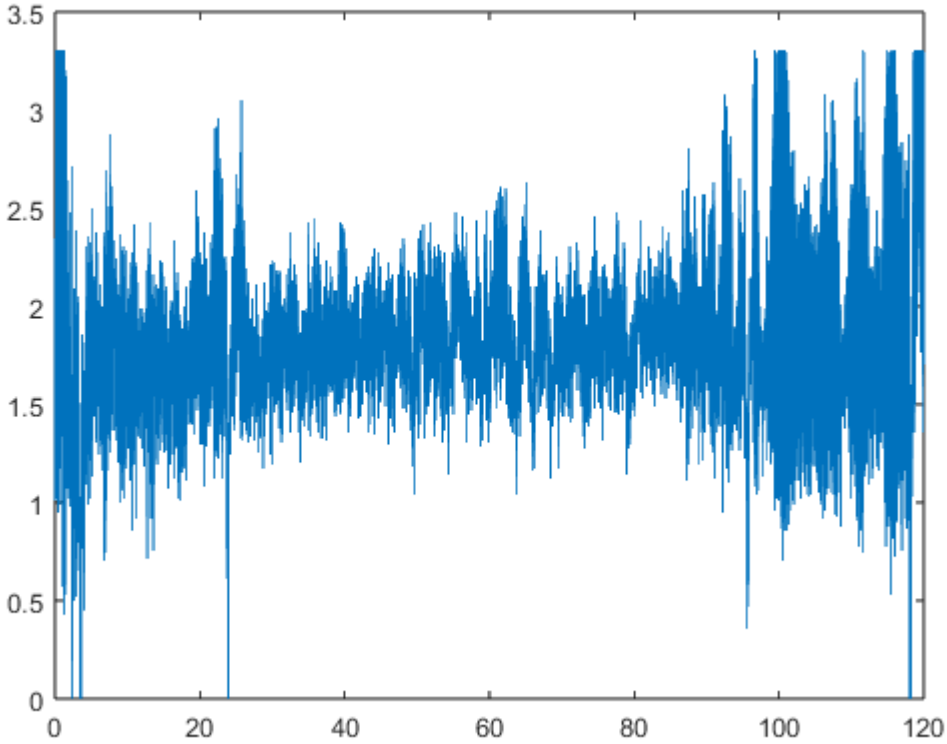


```
pspectrum(smoothedData_5*1,Fr_data,"spectrogram",'MinThreshold',-40,"TimeResolution",1.3,"Frequ
title('EMG_s_m_o_o_t_h_+_d_e_t_r_e_n_d_e_d')
```

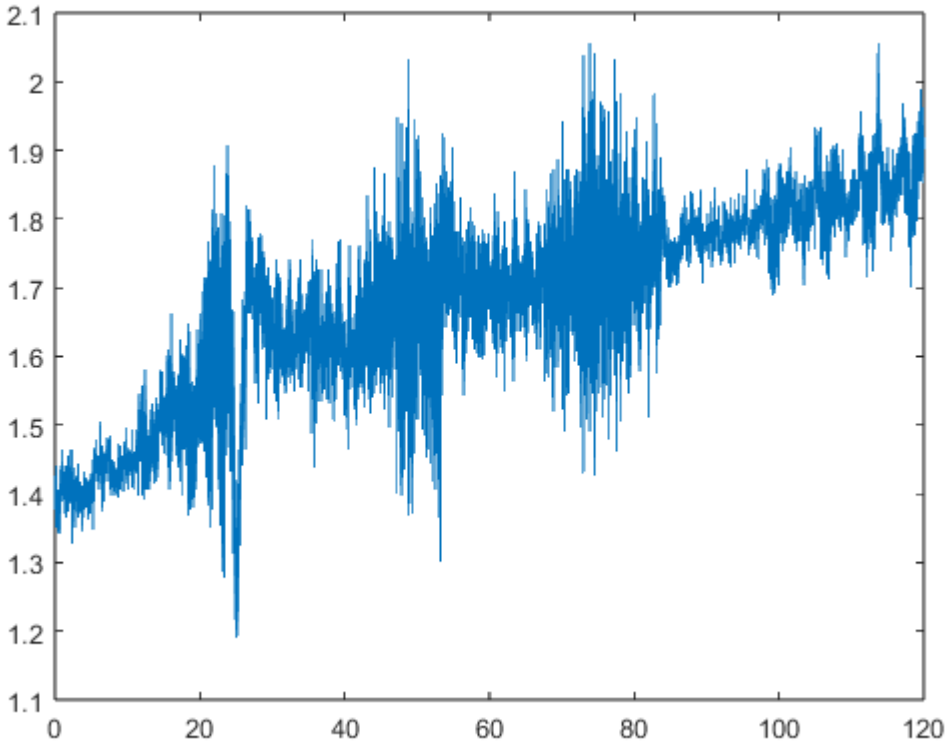



note that the trial 2 coducted is discarded due to conection issues

```
data_test2_eeg1=trial3.VarName1;
data_test2_emg1=trial3.VarName7;
data_test2_eeg1=data_test2_eeg1*(3.3/4096);
data_test2_emg1=data_test2_emg1*(3.3/4096);
Fr_data2=length(data_test2_emg1)/120;
ti_data2=1/Fr_data2;
T_data2=[0:1:(length(data_test2_eeg1)-1)]*ti_data2;
plot(T_data2,data_test2_eeg1)
```



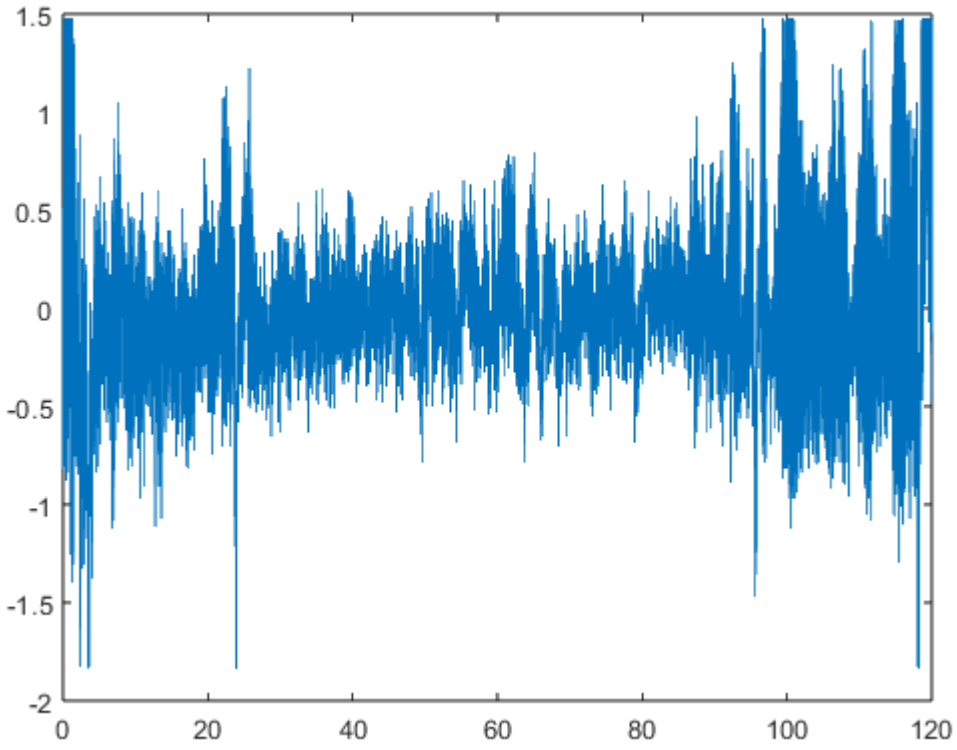

```
plot(T_data2,data_test2_emg1)
```



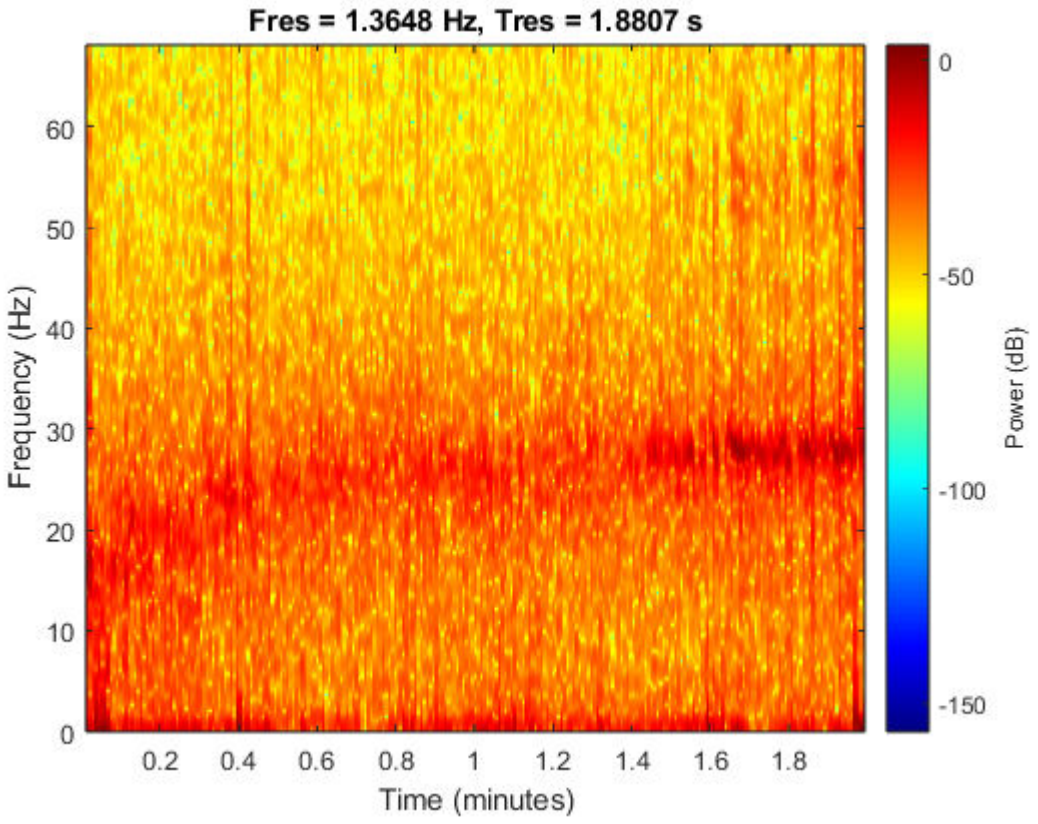
```
data_test2_eeg1_fft=fft(data_test2_eeg1);
data_test2_eeg1_fft(1)=0;
data_test2_eeg1=ifft(data_test2_eeg1_fft)
```

```
data_test2_eeg1 = 16334×1
   -0.8157
   -0.4355
    0.0044
    0.5160
    0.8222
    0.5346
   -0.1067
   -0.7561
   -0.5539
    0.0624
      ⋮
```

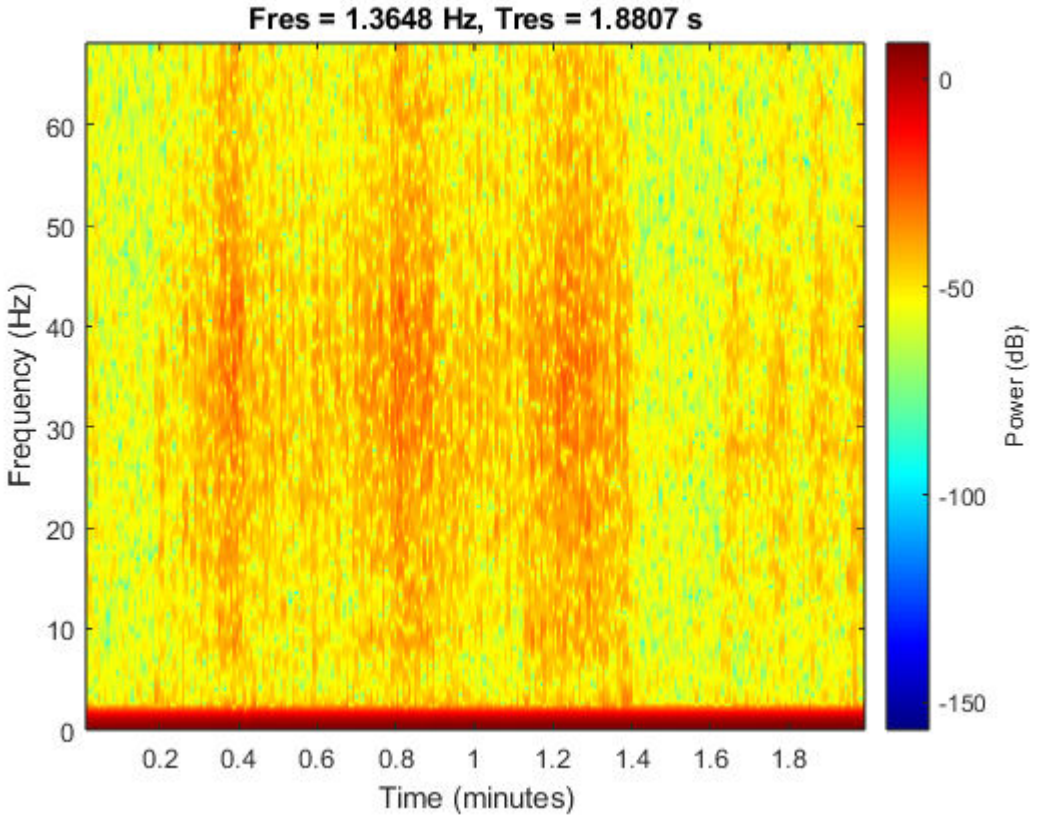
```
plot(T_data2,data_test2_eeg1);
```




```
pspectrum(data_test2_eeg1,Fr_data2,"spectrogram");
```




```
pspectrum(data_test2_emg1,Fr_data2,"spectrogram");
```



3rd trial data

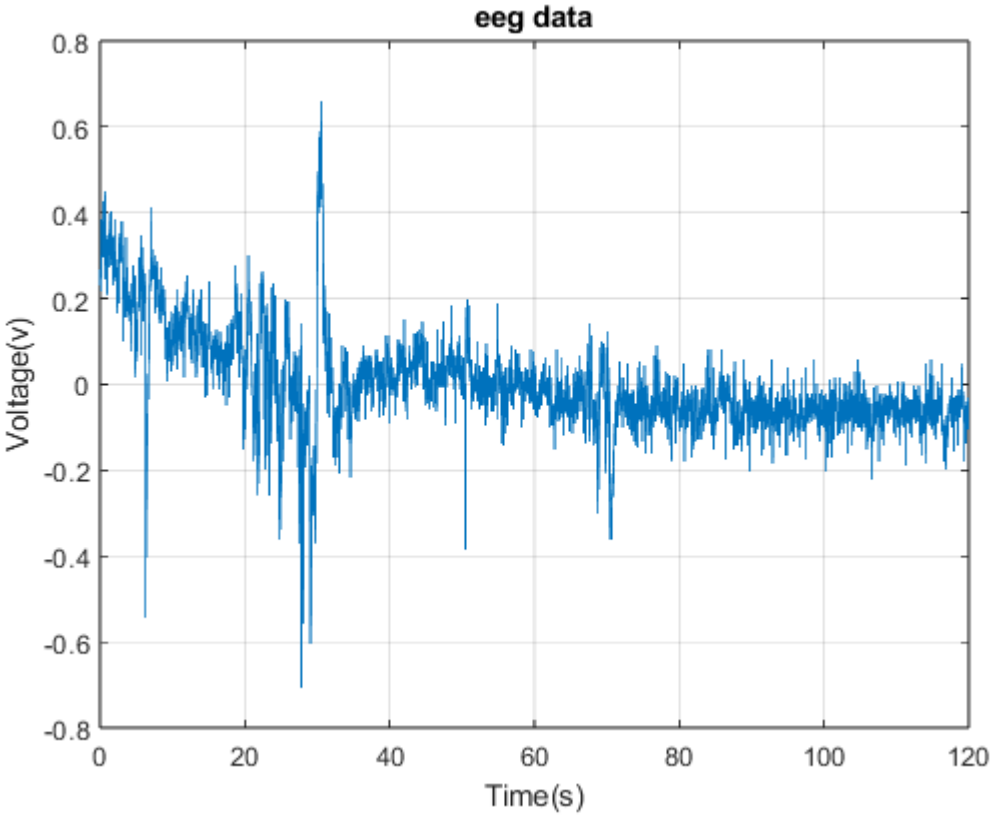
```
data_test3_eeg1=trial4.VarName1;
data_test3_emg1=trial4.VarName7;
data_test3_eeg1=data_test3_eeg1*(3.3/4096);
data_test3_emg1=data_test3_emg1*(3.3/4096);
Fr_data3=length(data_test3_emg1)/120;
ti_data3=1/Fr_data3;
T_data3=[0:1:(length(data_test3_eeg1)-1)]*ti_data3;
data_test3_eeg1_fft=fft(data_test3_eeg1);
data_test3_eeg1_fft(1)=0;
data_test3_eeg1=ifft(data_test3_eeg1_fft)
```

```
data_test3_eeg1 = 10432×1
    0.2294
    0.2697
    0.2286
    0.2181
    0.2294
    0.2721
    0.2673
    0.2834
    0.2463
    0.2834
      ⋮
```

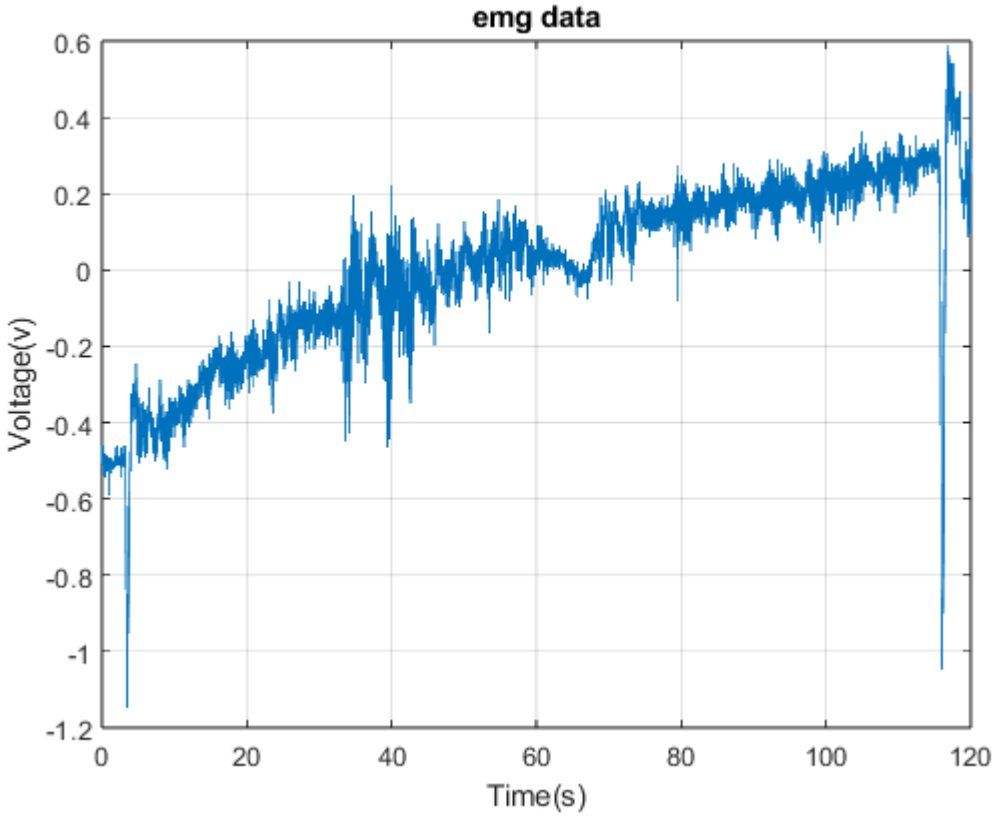
```
data_test3_emg1_fft=fft(data_test3_emg1);
data_test3_emg1_fft(1)=0;
data_test3_emg1=ifft(data_test3_emg1_fft)
```

```
data_test3_emg1 = 10432×1
   -0.4617
   -0.5052
   -0.4964
   -0.5068
   -0.4891
   -0.5157
   -0.5044
   -0.5350
   -0.5391
   -0.4923
      ⋮
```

```
plot(T_data3,data_test3_eeg1*1)
grid on
xlim('auto')
ylim('auto')
title('eeg data')
xlabel('Time(s)')
ylabel('Voltage(v)')
```



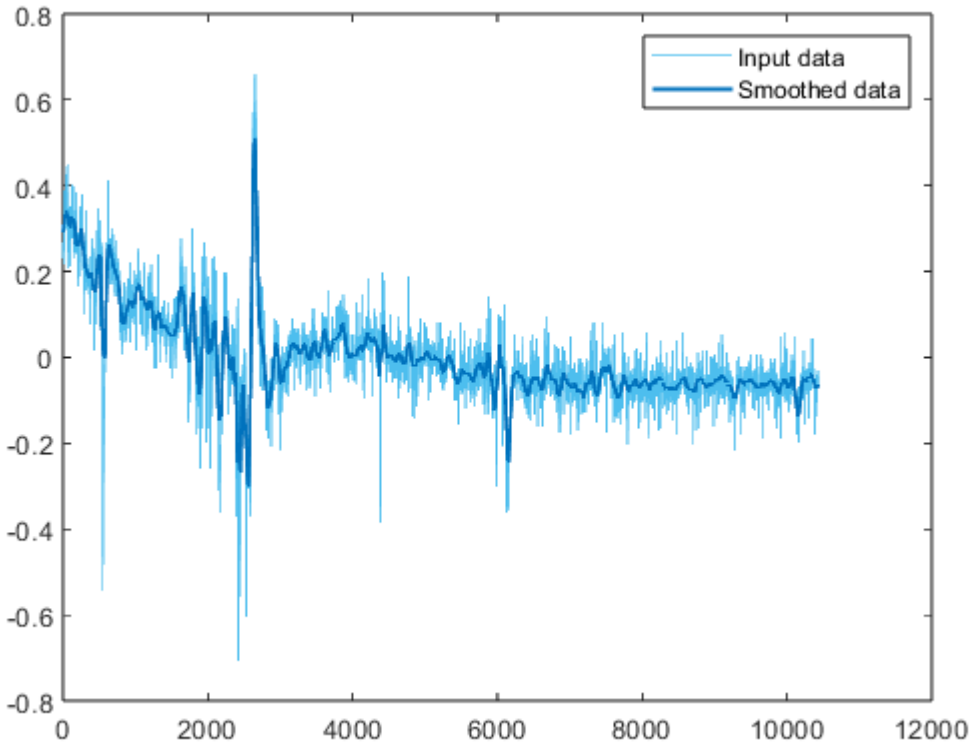

```
plot(T_data3,data_test3_emg1*1)
grid on
xlim('auto')
ylim('auto')
title('emg data')
xlabel('Time(s)')
ylabel('Voltage(v)')
```



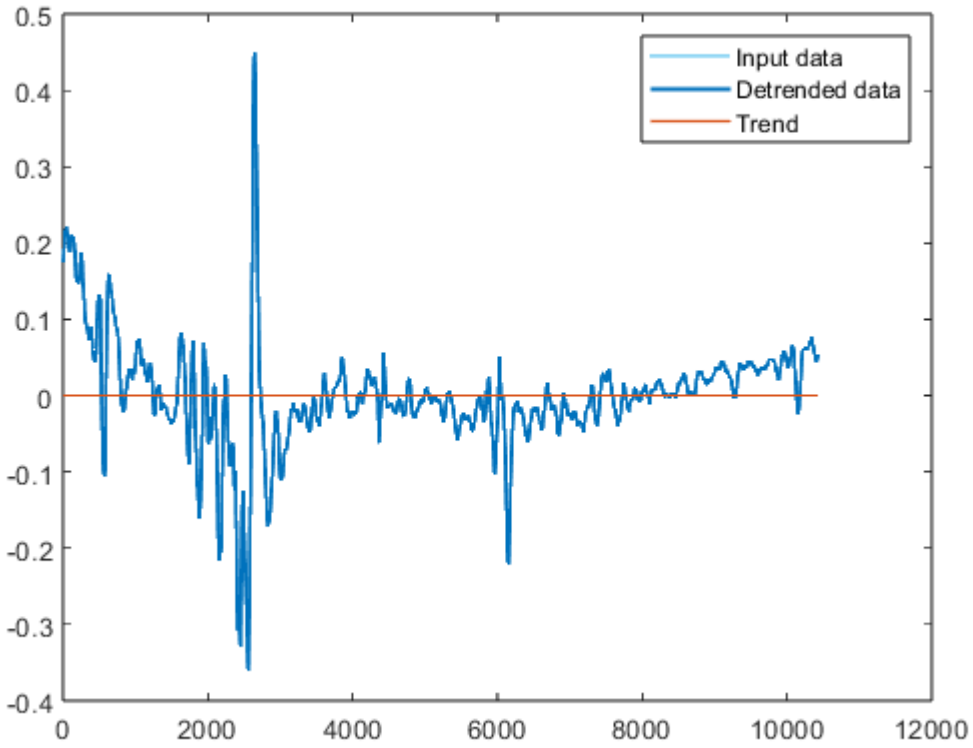

```
overlap=0
```

```
overlap = 0
```

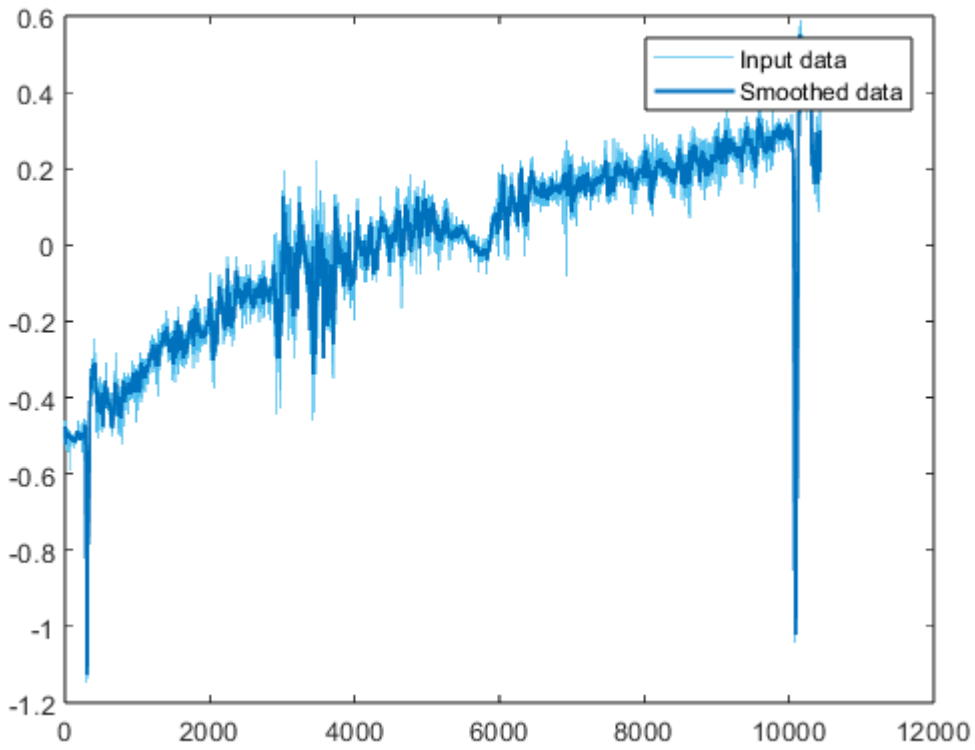
```
% Smooth input data
smoothedData_6 = smoothdata(data_test3_eeg1,"movmean","SmoothingFactor",0.25);

% Display results
clf
plot(data_test3_eeg1,"Color",[77 190 238]/255,"DisplayName","Input data")
hold on
plot(smoothedData_6,"Color",[0 114 189]/255,"LineWidth",1.5,...
    "DisplayName","Smoothed data")
hold off
legend
```



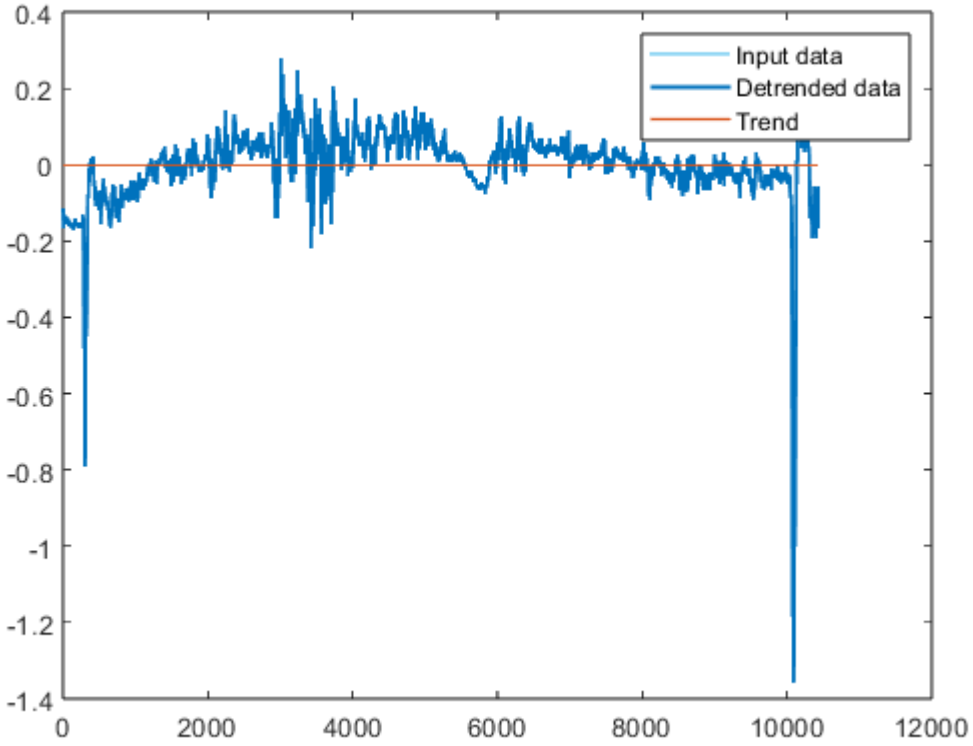

```
% Remove trend from data
smoothedData_6 = detrend(smoothedData_6);

% Display results
clf
plot(smoothedData_6,"Color",[77 190 238]/255,"DisplayName","Input data")
hold on
plot(smoothedData_6,"Color",[0 114 189]/255,"LineWidth",1.5,...
    "DisplayName","Detrended data")
plot(smoothedData_6-smoothedData_6,"Color",[217 83 25]/255,"LineWidth",1,...
    "DisplayName","Trend")
hold off
legend
```



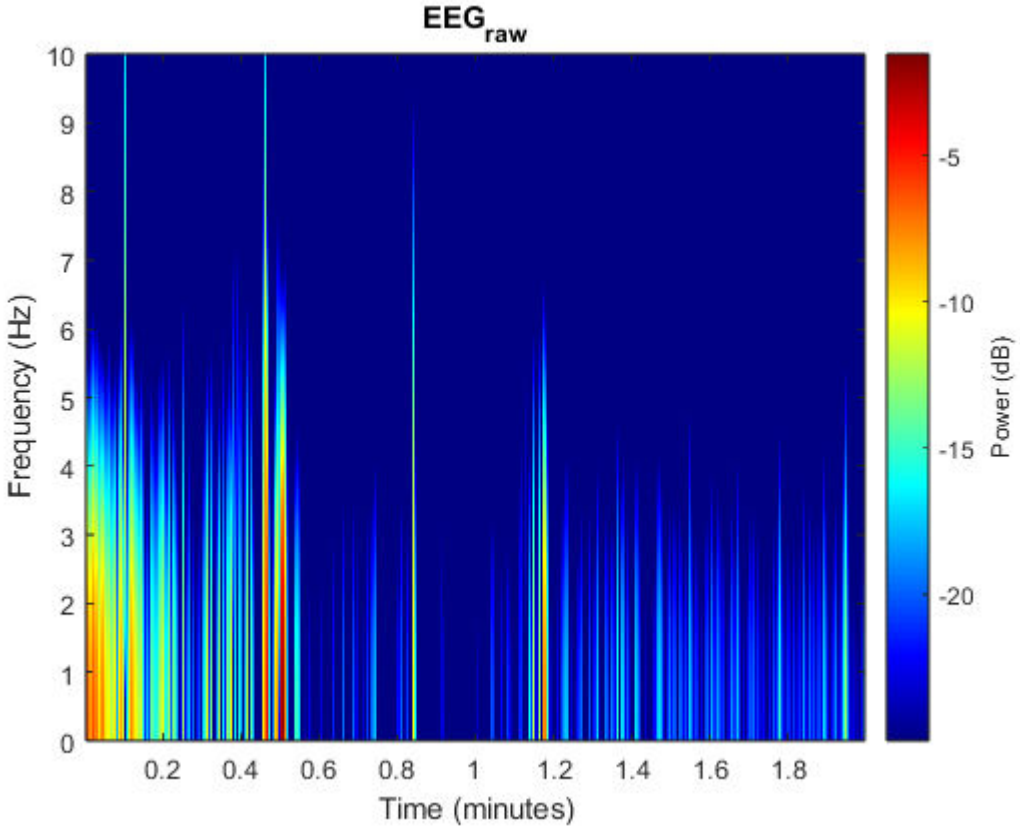

```
% Smooth input data
smoothedData_7 = smoothdata(data_test3_emg1,"rlowess","SmoothingFactor",0.02);

% Display results
clf
plot(data_test3_emg1,"Color",[77 190 238]/255,"DisplayName","Input data")
hold on
plot(smoothedData_7,"Color",[0 114 189]/255,"LineWidth",1.5,...
    "DisplayName","Smoothed data")
hold off
legend
```



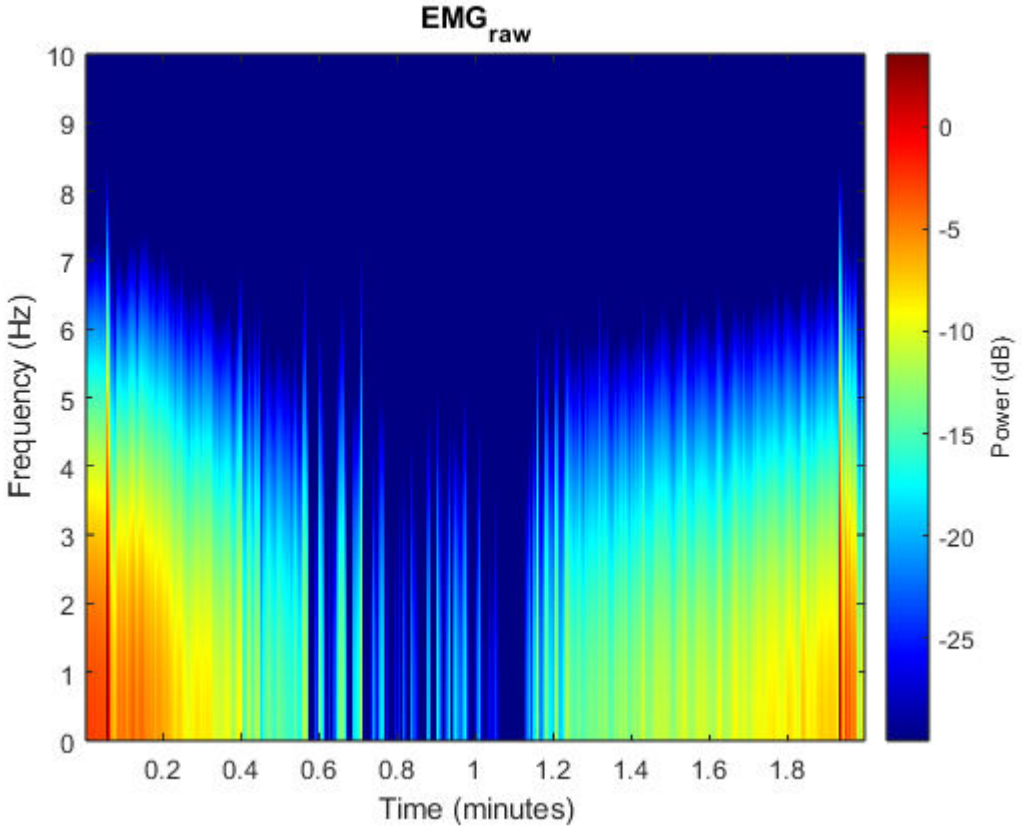

```
% Remove trend from data
smoothedData_7 = detrend(smoothedData_7);

% Display results
clf
plot(smoothedData_7,"Color",[77 190 238]/255,"DisplayName","Input data")
hold on
plot(smoothedData_7,"Color",[0 114 189]/255,"LineWidth",1.5,...
    "DisplayName","Detrended data")
plot(smoothedData_7-smoothedData_7,"Color",[217 83 25]/255,"LineWidth",1,...
    "DisplayName","Trend")
hold off
legend
```



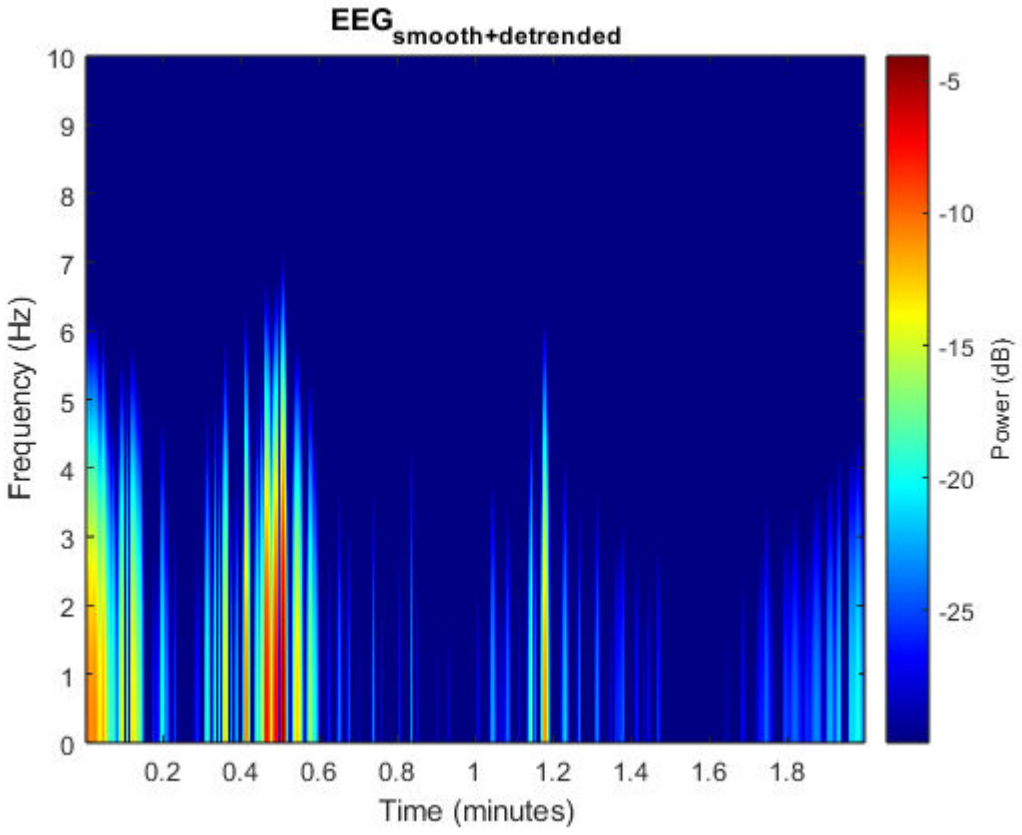

```
pspectrum(data_test3_eeg1*1,Fr_data3,"spectrogram",'MinThreshold',-25,"TimeResolution",0.5,"Fre
title('EEG_r_a_w')
```



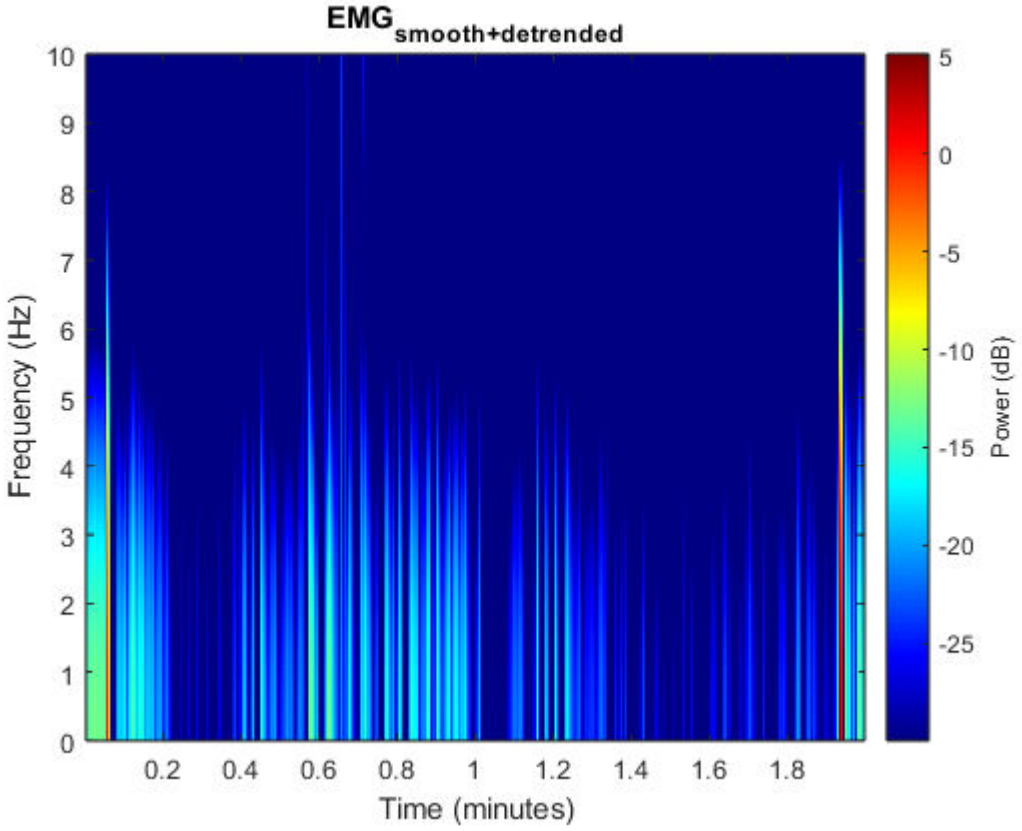

```
pspectrum(data_test3_emg1*1,Fr_data3,"spectrogram",'MinThreshold',-30,"TimeResolution",0.5,"Ove
title('EMG_r_a_w')
```




```
pspectrum(smoothedData_6*1,Fr_data3,"spectrogram",'MinThreshold',-30,"TimeResolution",0.5,"Over
title('EEG_s_m_o_o_t_h_+_d_e_t_r_e_n_d_e_d')
```

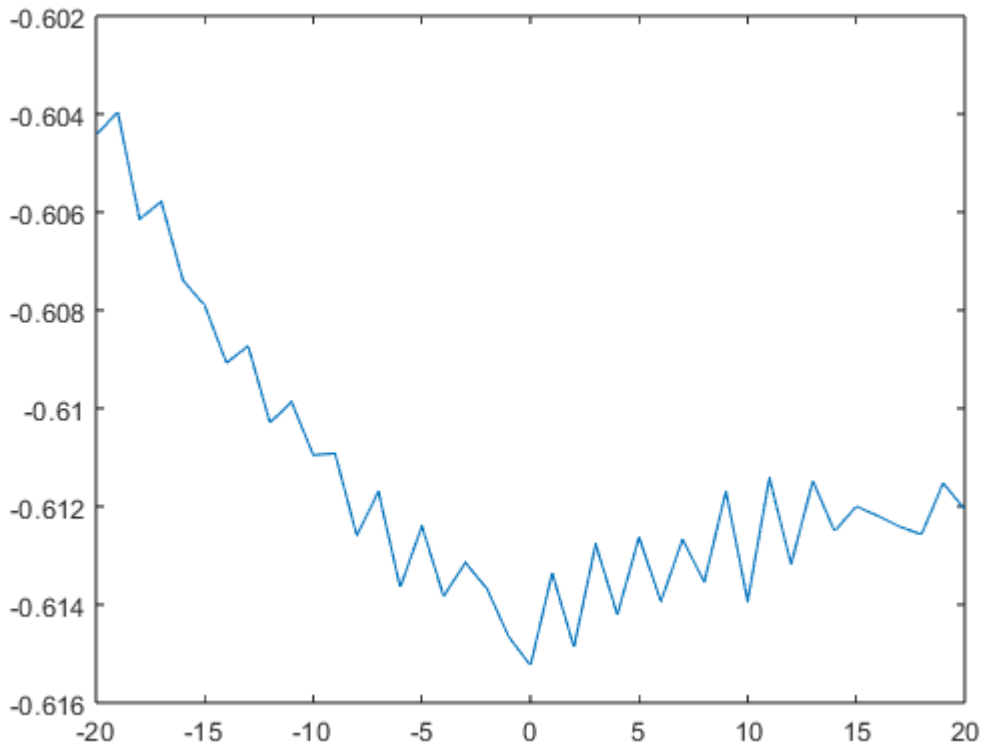



```
pspectrum(smoothedData_7*1,Fr_data3,"spectrogram",'MinThreshold',-30,"TimeResolution",0.5,"Over
title('EMG_s_m_o_o_t_h_+_d_e_t_r_e_n_d_e_d')
```




```
[eeg3corr,lagscorr3]=crosscorr(data_test3_eeg1*10,data_test3_emg1*10);
```

```
plot(lagscorr3,eeg3corr)
```




```
outeeg_and_emg1=[data_test_eeg1,data_test_emg1];
outeeg_and_emg1_smooth=[smoothedData_1,smoothedData_5];

outeeg_and_emg3=[data_test3_eeg1,data_test3_emg1];


outeeg_and_emg3_smooth=[smoothedData_6,smoothedData_7];
```

```
writematrix(outeeg_and_emg1,'D:\matlab\ymaps\code\outeeg_and_emg1.csv');
writematrix(outeeg_and_emg1_smooth,'D:\matlab\ymaps\code\outeeg_and_emg1_smooth.csv');
writematrix(outeeg_and_emg3,'D:\matlab\ymaps\code\outeeg_and_emg3.csv');
writematrix(outeeg_and_emg3_smooth,'D:\matlab\ymaps\code\outeeg_and_emg3_smooth.csv');
```