## Removing Electrode Motion Artifacts Using Butterworth Highpass filter

clc;

clear all;

close all;

%Loaded ECG Signal

load('100m.mat')

%Removing the Base and Gain from ECG Signal

ECGsignal\_original = (val -1024)/100;

Fs = 360;

%Frequency of PowerLine Interference

L = length(ECGsignal\_original);

t = (1:L)/Fs;

%Defining Cutoff Frequency and order

fc = 5;

n = 2;

[b,a] = butter(n,fc/(Fs/2),'high');

t1 = tf(b,a,1/Fs)

[z,p,k] = tf2zp(b,a)

zplane(z,p,k)

grid on

w = 0:2\*pi/Fs:pi;

freqz(b,a,w)

%Reconstructing the signal

ECG\_filtered = filter(b,a,ECGsignal\_original);

subplot(211)

plot(t,ECGsignal\_original)

title('ECG Signal with Artifacts')

xlabel('time(s)')

ylabel('Amplitude(mV)')

xlim([0.00 2.23])

ylim([-11.18 -8.81])

grid on

subplot(212)

plot(t,ECG\_filtered)

title('ECG Signal without Artifacts')

xlabel('time(s)')

ylabel('Amplitude(mV)')

xlim([0.00 2.16])

ylim([-2.0 5.0])

grid on