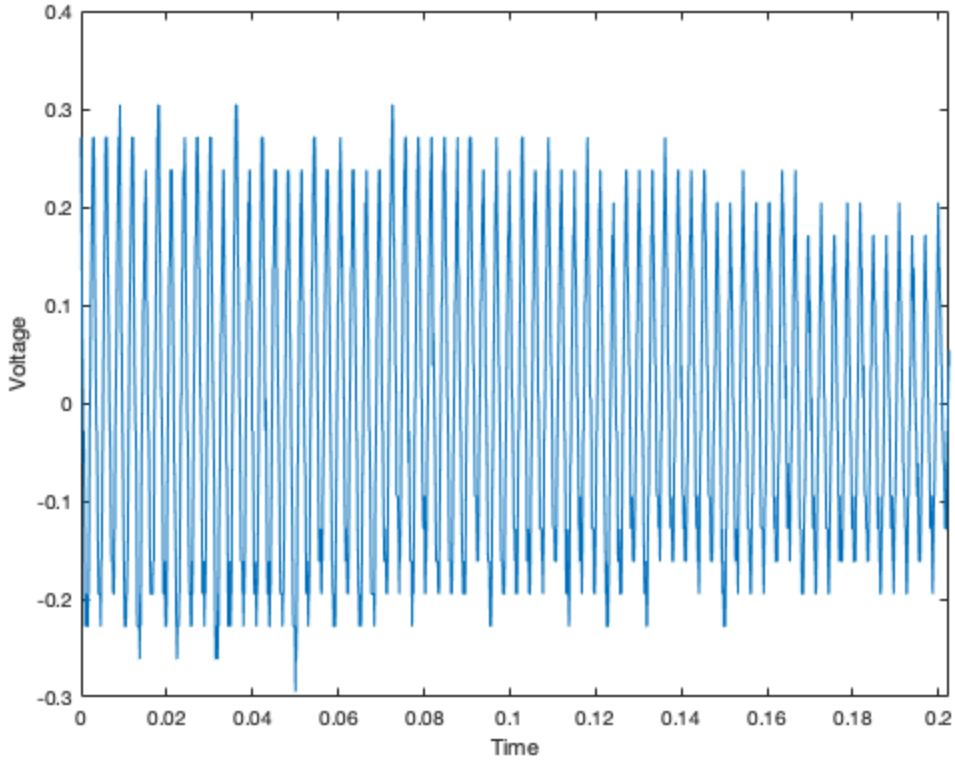
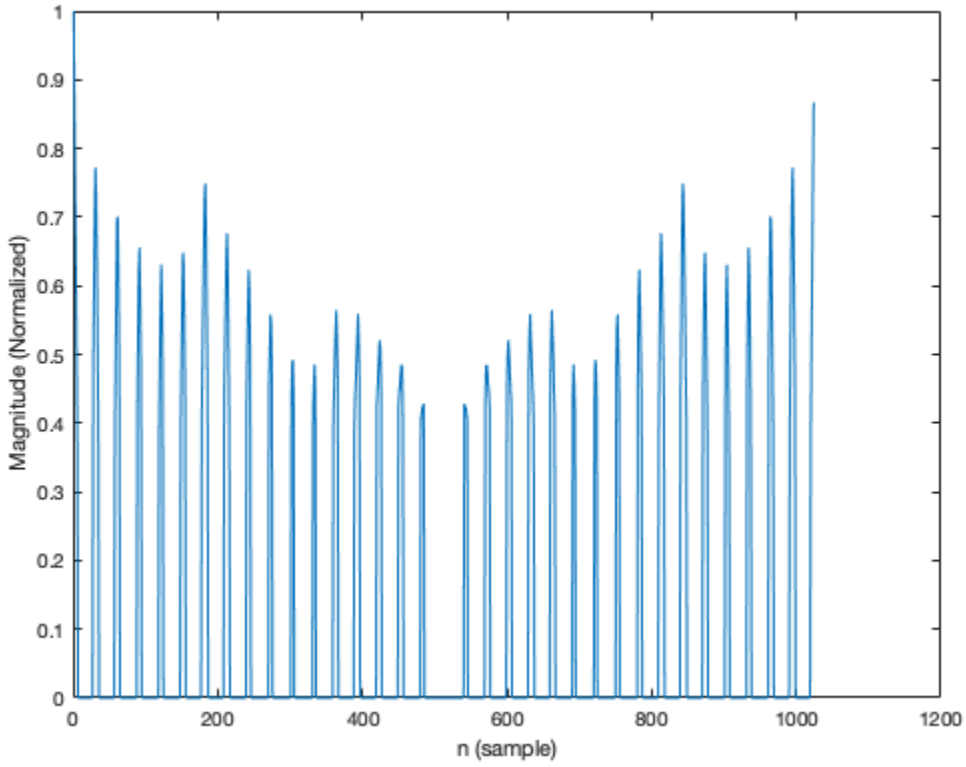
```
%[ip, fs] = audioread('440pure.mp4', [1 20000]); %[1 20000]
%a = csvread('low_e_10k.csv', 11);
a = csvread('high_e_10kHz.csv', 11);
% a = csvread('d_10k.csv', 11);
%a = csvread('a_10k.csv', 11);
%a = textread('a_10k.csv',%d, 11);
ip = a(:,2);
axis = a(:,1);

%scale CSV
ip = ip*100;

%center at zero
avg = mean(ip);
ip = ip -avg;

%Sampling rate
fs = 10e3;


min_expected_period = 50;
max_expected_period = 500;
%number of samples
frame_len = 1024;

figure(1)
plot(axis, ip);
xlabel('Time')
xlim([0 .2024])
ylabel('Voltage')



for k = 1 : length(ip)/(frame_len -1)
   range = (k-1)*frame_len + 1:k*frame_len;
   frame = ip(range);
     %frame = ip ;


    %Perform autocorrelation
    %this is the equivalent computation as a series of discrete sums
    %but in the frequency domain
    fftx = fft(frame);
    magSquare = abs(fftx).*abs(fftx);
    rxx = ifft(magSquare);


    %normalized by the amount of energy in the signal
    %the origin of the autocorrelated is the energy, E, contained
    %in the signal
    ryy = rxx/rxx(1);
```

```
    %zero out negative correlations
    index = find(ryy<0);
    ryy(index) = 0;

    %find standard deviation and mean
    dev = std(ryy);
    avg = mean(ryy);


    %zero out terms less than threshold
    indexes = find(ryy<(avg+dev));

    ryy(indexes) = 0;

    %onlyPeaks = ryy(indexes);
    onlyPeaks = ryy;


    %%perform rudimentary peak detection
    for i = 2:(length(onlyPeaks)-1)


        if((onlyPeaks(i) - onlyPeaks(i-1) > 0) && ((onlyPeaks(i+1) -
 onlyPeaks(i)) < 0))
            thePeakIs = i;

        elseif((onlyPeaks(i) - onlyPeaks(i-1) > 0))
            continue

        elseif((onlyPeaks(i+1) - onlyPeaks(i)) < 0)
            continue
        end
    end

    %returns mirror image on other end of array
    %calculate note value
    note = fs/(frame_len-thePeakIs)




    %create x-axis dimension
    x = 1:1:length(rxx);

    figure(2)
    plot(x, ryy)
    xlabel('n (sample)')
    ylabel('Magnitude (Normalized)')

    %pause and wait for use input
    pause

end
```

```
note =

  344.8276

note =

  344.8276

note =

  344.8276

note =

  344.8276

note =

  344.8276

note =

  344.8276

note =

  344.8276

note =

  344.8276
```


Voltage
Time
0.4
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
0
0.02
0.04
0.06
0.08
0.1
0.12
0.14
0.16
0.18
0.2


Magnitude (Normalized)
n (sample)
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0
200
400
600
800
1000
1200

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