

Agenda CENG 3315 March 7 , 2022 Chapter 5

On Course Web:

Chapter 5: [Lecture_5_1](#)

[Review_Ch5_Lecture](#) [Two Interesting FIR Examples](#)

[Lecture5_2_LTI_Convolve](#) [Discrete&Continuous_Convolve](#)

[ProblemSession1_Ch5](#) [MATLAB_Ch5](#)

[Chapter5_ShortReviews](#)

[Ch5_Moving_Avg](#) [Ch5_Impulse_Response](#) [Ch5_LTI_Convolve](#)

[Euler_Convolve_Review](#)

1_Lecture5_1_DSPFirst-Ch5_L11_TLH.pdf

2_REVIEW OF CH5 LECTURE 1.pdf

3_TwoInteresting FIR Examples_church_50Hz.pdf

3a_DorranInChurch_code.docx

Run My Code DorranInChurch_2021_TLHdemo.m

```
% DorranInChurch_2021_TLHdemo.m      1b   Run Program
clc, clear all, clf
church = audioread('church.wav')
audioinfo('church.wav')
% NumChannels:1 SampleRate:16000;TotalSamples:8206
%   Duration: 0.5129   sec
Fschurch= 16000;   % Samples/sec
% Plot
figure(1), plot(church), title('Impulse Response of Church')
sound(church, 16000)
%
churchlen= length(church); % churchlen = 8206 points
ts=1/Fschurch   % ts = 6.2500e-05 sec
t_duration = length(church)/Fschurch % t_duration =0.5129
disp('Start speaking for 10 seconds.')
record_voice = audiorecorder(16000, 16, 1);
%disp('Start speaking for 10 seconds.')
recordblocking(record_voice,10);
disp('End of Recording.');
```

pause(2)

```

p = play(record_voice); % listen to complete recording
pause(10)
mySpeech = getaudiodata(record_voice, 'int16'); % get data as int16 array
%
disp('Speaking in Church')
pause(2)
output=conv(mySpeech,church);
soundsc(output, 16000);

```

3b. Show 50 Hz Notch Filter

DSP: Using an FIR filter to remove 50/60Hz from an ECG (MATLAB/OCTAVE) 6:31

<https://www.youtube.com/watch?v=r7ypfESTQK0&feature=youtu.be>

An electrocardiogram (ECG) is a medical test that detects heart problems by measuring the electrical activity generated by the heart as it contracts. ECGs from healthy hearts have a characteristic shape. If the ECG shows a different shape it could suggest a heart problem.

4_DSPFirst-Ch5_L12_tlh_SP21_LTI_Convolve.pdf

5_Discrete and Continuous_CONVOLUTION_RC_TLH.pdf

6_ProblemSession_Ch5_Convolve_SmoothFilter.pdf

7_MATLAB_Ch5_SmoothingFilter.pdf