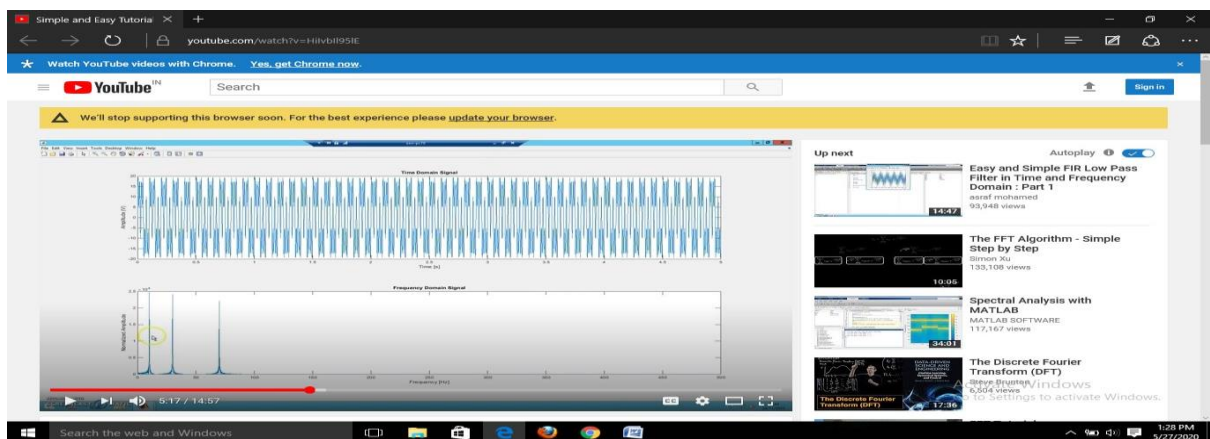
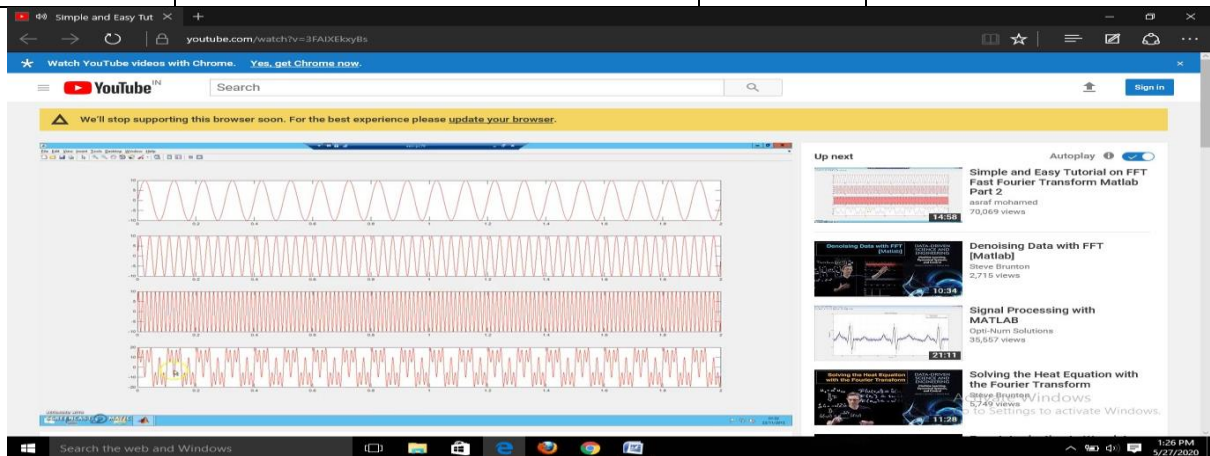


Date:	27-05-2020	Name:	Poorvi hj
Course:	Digitalsigna processing	USN:	4AL17EC071
Topic:	FFT,FFTFastFourierTransformMatlab, FIRandIIRFilters,StudyandanalysisFIR andIIRusingFDAtoolinMatLab, IntroductiontoWT,CWT&DWT, ImplementationofsignalFilteringsignal usingWTinMatLab,Short-timeFourier TransformandtheSpectrogram,Welch's methodandwindowing,ECGSignal AnalysisUsingMATLAB.	Semester and section	6 th sem'B'section
Github repository:	Poorvi-2000		



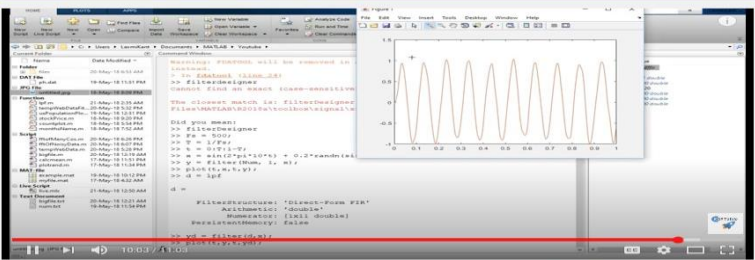
42 MATLAB Beginner's Tutorial

youtube.com/watch?v=MTQ07RqHUBA

Watch YouTube videos with Chrome. Yes, get Chrome now.

YouTube

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Up next

41 MATLAB Beginner's Tutorial: Low Pass Filter Design in MATLAB

Denosing Data with FFT [Matlab]

Designing Digital Filters with MATLAB

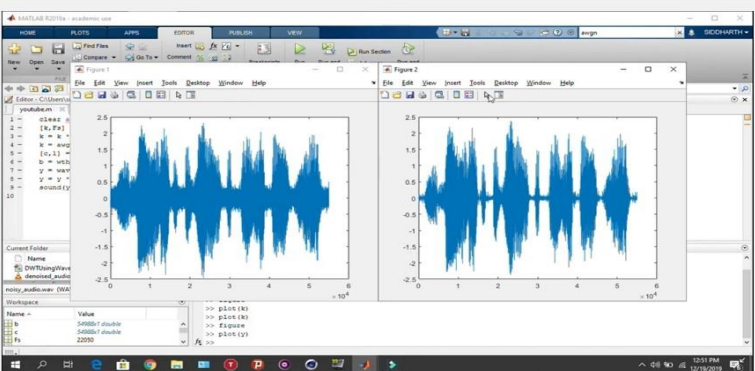
Simple audio denoising

youtube.com/watch?v=Eqx4lxbqI

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Up next

Matlab Wavelet Toolbox Introduction

The Fast Fourier Transform Algorithm

Easy Introduction to Wavelets

The Discrete Fourier Transform (DFT)

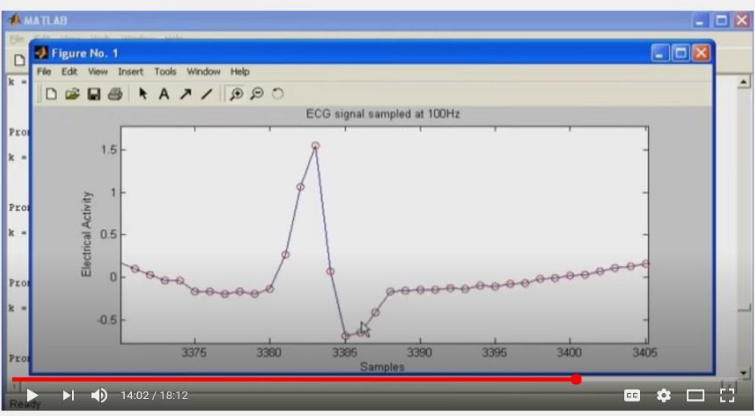
ECG Signal Analysis Using MATLAB

youtube.com/watch?v=Q1p_LsWW7fk

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Up next

Matched filters: Python demo detecting heartbeats (Py)

Ecg graph digitizing using matlab 2015

Microsoft Access 2016 Tutorial: A Comprehensive Guide to Access - Part 1 of 2

The Fast Fourier Transform (FFT)

27/05/2020

Digital Signal processing

Day - 3

* Fourier Transform

The function $F(s)$ is defined by

$$F(s) = \int_{-\infty}^{\infty} f(x) \cdot e^{isx} dx$$

is called Fourier Transform of $f(x)$

Also the funⁿ $f(x)$ defined by

$$f(x) = \frac{1}{2\pi} \int_{-\infty}^{\infty} F(s) \cdot e^{-isx} ds$$

is called: Inverse Fourier Transform
of $F(s)$ (or) Inversion Formula

* FFT

$$X_p = \sum_{n=0}^{N-1} x_n \cdot w_N^{pn} \quad 0 \leq p \leq N-1$$

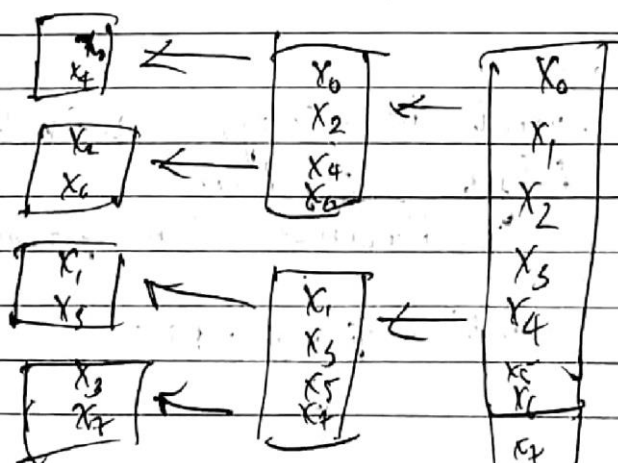
\uparrow
 $w_N \triangleq e^{-j\frac{2\pi}{N}}$

$$X_0 = x_0 + x_1 + x_2 + x_3$$

Inputs to
2-point DFTs

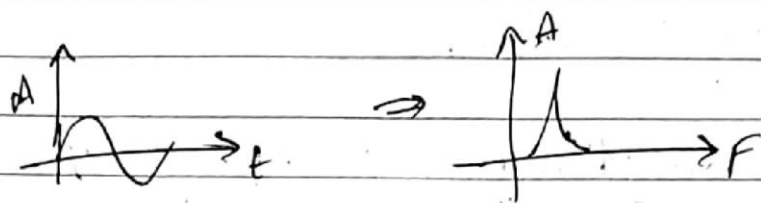
Inputs to
4-point DFT

Inputs to
8-point DFTs



* FFT fast fourier Transform Matlab

FFT



FIR and IIR Filters

FIR filter

- Consider system described by the transfer function

$$H(z) = \frac{b_3 z^3 + b_2 z^2 + b_1 z + b_0}{z^3}$$

- The corresponding Diff Equⁿ

$$y[k] = b_3 f[k] + b_2 f[k-1] + b_1 f[k-2] + b_0 f[k-3]$$

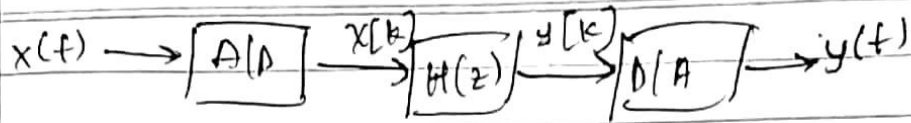
Show the current output is a function of current & past inputs

- FIR filters only have poles at the origin

Introduction

- we want to design equivalent Digital Systems
Continuous Time System

$$x(t) \rightarrow [H(\omega)] \rightarrow y(t)$$



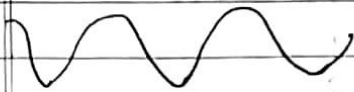
Equivalent Discrete-time system.

- Input to $H(z)$ is $x[k] = x(kT)$
- output of $H(z)$ is $y[k] = y(kT)$

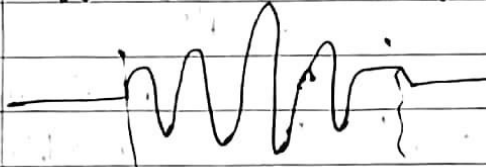
★ Study and analysis FIR and IIR using FDA tool in Matlab

★ Introduction to WT

FT



wavelet Transform



Resolution

Wavelet Transform

frequency resolution

time resolution

high frequency
(low scale)

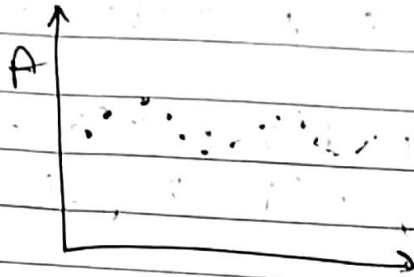
★ CWT and DWT

Fourier Series

$$f(t) = \frac{1}{T} a_0 + \sum_{k=1}^{\infty} (a_k \cos 2\pi k t + b_k \sin 2\pi k t)$$

Brilliant Kt!

$$X(F) = \int_{-\infty}^{\infty} x(t) e^{-j2\pi Ft} dt$$



Discrete Fourier Transform

Continuous $X(F) = \int_{-\infty}^{\infty} x(t) e^{-j2\pi Ft} dt$

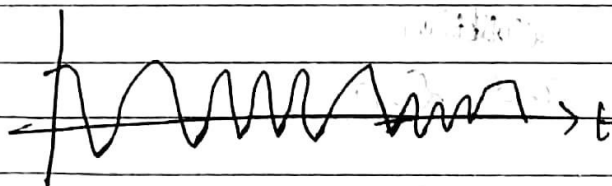
discrete $X_k = \sum_{n=0}^{N-1} x_n \cdot e^{-j2\pi kn/N}$

↑
evaluating at n of N samples

★ Implementation of Signal Filtering
signal using WT in matlab

★ Short-time Fourier Transform and
the Spectrogram:

Analysis of time-varying spectral
characteristics * Speech, seismicology,



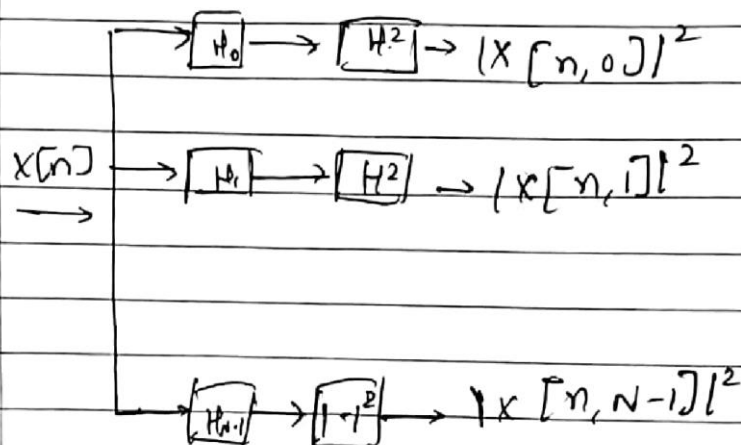
Apply DFT to windowed segments
of data

Display DFT coefficients at a fun of time and frequency.

Inverse STFT:

$$x[n+m] = \frac{1}{NW[m]} \sum_{k=0}^{N-1} X[n,k] e^{j2\pi \frac{k}{N} m}$$

Filter Bank Interpretation



* Welch's method and windowing

$$w[n] \xrightarrow{Q=1} [W(e^{j\omega})] \rightarrow x[n]$$

$$S_{xx}(\omega) = |H(e^{j\omega})|^2$$

$$S_{xx}(f) = |H(e^{j2\pi f/P})|^2$$

* ECG Signal Analysis using matlab

Date:	27-05-2020	Name:	Poorvi hj
Course:	Pythonprogramming	USN:	4AL17EC071
Topic:	Graphicaluserinterfaceswith Tkinter&interactingwith database.	Semester and section:	6 th sem and Bsec

170. Setting up a GUI with Widgets

```

script1.py
1 from tkinter import *
2
3
4
5
6
7
8 e1=Entry(window)
9 e1.grid(row=0,column=1)
10
11 t1=Text(window,height=1,width=20)
12 t1.grid(row=0,column=2)
13
14 window.mainloop()
15

```

tk

Execute

```

PS D:\pp\tkinter section> python .\script1.py
PS D:\pp\tkinter section> python .\script1.py
PS D:\pp\tkinter section> python .\script1.py
PS D:\pp\tkinter section> python .\script1.py
PS D:\pp\tkinter section> python .\script1.py
PS D:\pp\tkinter section> python .\script1.py
PS D:\pp\tkinter section> python .\script1.py

```

Activate Windows
Go to Settings to activate Windows.

171. Connecting GUI Widgets with Callback Functions

```

script1.py
1 from tkinter import *
2
3 window=Tk()
4
5 def km_to_miles():
6     miles=float(e1_value.get())*1.6
7     t1.insert(END,miles)
8
9 b1=Button(window,text="Execute",command=km_to_miles)
10 b1.grid(row=0,column=0)
11
12 e1_value=StringVar()
13 e1=Entry(window,textvariable=e1_value)
14 e1.grid(row=0,column=1)
15
16 t1=Text(window,height=1,width=20)
17 t1.grid(row=0,column=2)
18
19 window.mainloop()

```

```

File "C:\Users\Maris.Grete-PC\AppData\Local\Programs\Python\Python35-32\lib\tkinter\_init_.py", line 1549, in __call__
    return self.func(*args)
File ".\script1.py", line 7, in km_to_miles
    miles=e1_value.get()*1.6
TypeError: can't multiply sequence by non-int of type 'float'
PS D:\pp\tkinter section> python .\script1.py
10
PS D:\pp\tkinter section>

```

Activate Windows
Go to Settings to activate Windows.

Solution

```
1 from tkinter import *
2
3 # Create an empty Tkinter window
4 window=Tk()
5
6 def from_kg():
7     # Get user value from input box and multiply by 1000 to get kilograms
8     gram=float(e2_value.get())*1000
9
10    # Get user value from input box and multiply by 2.20462 to get pounds
11    pound=float(e2_value.get())*2.20462
12
13    # Get user value from input box and multiply by 35.274 to get ounces
14    ounce=float(e2_value.get())*35.274
15
16    # Empty the Text boxes if they had text from the previous use
17    t1.delete("1.0", END) # Deletes the content of the Text box from 1.0 to the end
18    t1.insert(END,gram) # Fill in the text box with the value of grams
19    t2.delete("1.0", END)
20    t2.insert(END,pound)
21    t3.delete("1.0", END)
22    t3.insert(END,ounce)
23
24 # Create a Label widget with "Kg" as label
25 e1=Label(window,text="Kg")
26 e1.grid(row=0,column=0) # The Label is placed in position 0, 0 in the grid
27
28 e2_value=StringVar() # Create a special StringVar object
29 e2=Entry(window,textvariable=e2_value) # Create an Entry box for user input
30 e2.grid(row=0,column=1)
31
32 # Create a button widget
33 # The from_kg() function is called when the button is pushed
34 b1=Button(window,text="Convert",command=from_kg)
```

Activate Windows
Go to Settings to activate Windows.



27/05/2020

Day-8

Graphical user interfaces with
Tkinter and Interacting
with Database.

- ★ Introduction to Tkinter
- ★ Setting up a GUI with widgets
- ★ Connecting GUI widgets with
Callback Functions
- ★ Create a multi-widget GUI
- ★ ~~to~~ Solution