

Daily Assessment format

Date: 27 May 2020

course: ESE

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Topic: Fourier transforms

- FFT
- FFT fast Fourier transform matlab
- FIR & IIR filters
- Study & analysis FIR & IIR using FDA tool in matlab
- Introduction to WT
- CWT & DWT
- Implementation of signal filtering signal using WT in matlab
- Short-time Fourier transform & the spectrogram
- Welch's method & windowing
- ECG Signal Analysis using matlab

GitHub

Repository: Jyoti-course

forenoon session details

Report

Fourier transforms

Digital signal processing / Discrete Fourier transform.
As the name implies, the Discrete Fourier transform is purely discrete. discrete time data sets are converted into a discrete frequency representation. This is in contrast to the DFT that uses discrete time, but converts to continuous freq.

- The function $F(s)$, defined by
$$F(s) = \int_{-\infty}^{\infty} f(x) e^{isx} dx$$
 is called Fourier transform of $f(x)$

- The inverse Fourier transform is given as,

Also the $f(x)$, defined by
$$f(x) = \frac{1}{2\pi} \int_{-\infty}^{\infty} F(s) e^{-isx} ds$$
 is called inverse Fourier transform of $F(s)$

Fast Fourier Transform

$$X_p = \sum_{n=0}^{N-1} x_n \cdot W_N^{np}$$

$$0 \leq p \leq N-1$$

$$W_N = e^{-j2\pi/N}$$

FFT fast fourier transform matlab code

$$Fs = 1000$$

$$Ts = 1/Fs$$

$$dt = 0:Ts:5-Ts$$

$$f_1 = 10$$

$$f_2 = 30$$

$$f_3 = 50$$

$$y_1 = 10 \times \sin(2 \times \pi \times f_1 \times dt)$$

$$y_2 = 10 \times \sin(2 \times \pi \times f_2 \times dt)$$

$$y_3 = 10 \times \sin(2 \times \pi \times f_3 \times dt)$$

$$y_4 = y_1 + y_2 + y_3$$

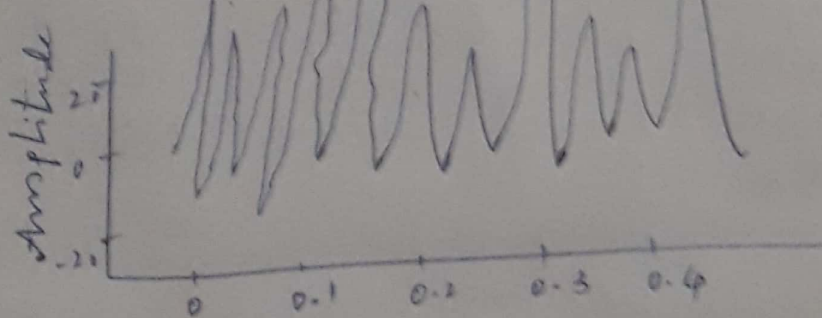
$$nfft = \text{length}(y_4)$$

$$nfft2 = 2 \times \text{nextpow2}(nfft)$$

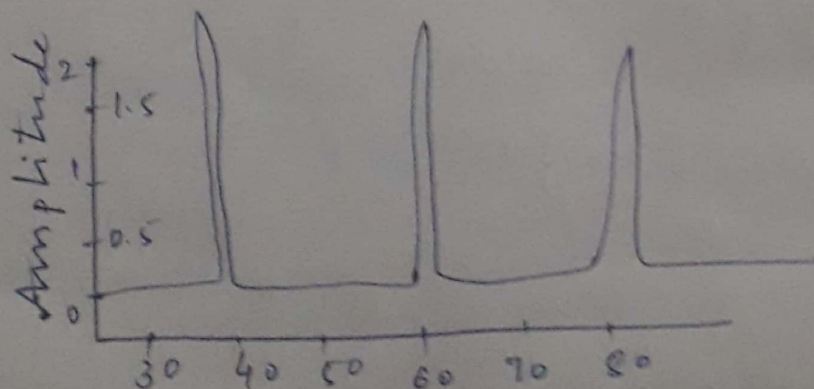
$$ff = \text{fft}(y_4, nfft2)$$

$$\text{plot}(\text{abs}(ff));$$

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Time domain signal



freq domain signal

FIR & IIR filters

• FIR filter

consider the function described by the transfer function.

$$H(z) = b_3 z^3 + b_2 z^2 + b_1 z + b_0$$

the corresponding difference eqn

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

• IIR filter

consider the function described by the transfer function

$$H(z) = \frac{b_3 z^3 + b_2 z^2 + b_1 z + b_0}{z^3 + a_2 z^2 + a_1 z + a_0}$$

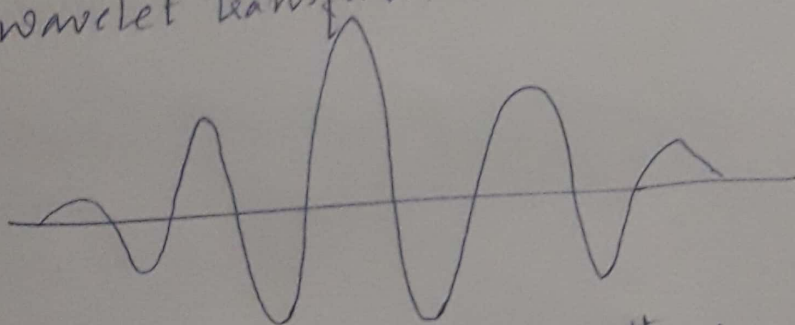
the corresponding difference eqn

$$y[k] = -a_2 y[k-1] - a_1 y[k-2] - a_0 y[k-3] + b_3 y[k] + b_2 y[k-1] + b_1 y[k-2] + b_0 y[k-3]$$

Introduction to WT

- A wavelet transform (WT) is the decomposition of signal consisting of contractions, expansions, & translations of the wavelet

wavelet transform



Implementation of signal filtering signal using WT in matlab

code

```
clear all
[k, Fs] = audioread('man_voice.wav');
k = k * 0.5 / rms(k);
k = amsgn(k, 12, 'measured');
[c, l] = wavedec(k, 3, 'db4');
```

```

b = with_audio(0, 'a', 0.1);
y = wavread(b, 'd4');
y = y * 0.5 / rms(y);
sound(y, fs);

```

Short time fourier transform & spectrogram

- the short time fourier transform (STFT) is a sinusoidal freq & phase content of local time.
- In practice, the procedure for computing STFT is to divide segments of equal length & then compute the fourier shorter segment.
- This reveals the fourier spectrum on each shorter segment changing spectra as a func of time, known as spectrogram.

welch's method & windowing

- welch's method (1961) also called the periodogram method carried out by dividing the time signal into successive blocks each block & averaging is the rectangular window. the non-overlapping successive blocks of data.

Date: 29/11/2020
Course: Introduction to
Information Security
Topic: Introduction

Name: Nisha K. Dinesh
Ver: 1.0 / 1.1 / 1.2 / 1.3 / 1.4 / 1.5 / 1.6 / 1.7 / 1.8 / 1.9 / 2.0

Afternoon session details

Image of session

Learning material

- Stanford & computer security
- intro to Stanford & computer security field
- computer security - its applications & its future
- innovations in cybersecurity - quantum computing
- what is the future of cryptographies

Report

- client state manipulation
- SQL injection
- password security
- cross domain security & web application
- cryptography concept
- case studies

client state manipulation

- what is client state?
- How can you alter the client state?
- How to stop the client state manipulation attack
- Authenticative state on the server session ids - proof
cons signed state to client proof & cons
- Data leakage - HTTP: "GET" & "POST" methods
- Cookies & Javascript

Types of SQL injection

- Tamaraht you want to do To me what to wt to do protect

- SQL injection

- Bypass Authentication injection

- Union based injection als advance SQL Error BASED SQL injection

- Blind SQL injection

- How to prevent SQL injection

- Blacklisting

- White listing

- prepared statements hardening PB + OS