

DSP day -3 Report

The Fourier transform of a function of time is a complex-valued function of frequency, whose Magnitude (Absolute value) is the original function and whose Argument is the phase offset of the order basic sinusoid in that frequency. The Fourier transform is not limited to the functions of time, but the domain of the original function is commonly referred to the time domain. There is also an Inverse Fourier Transform and Mathematically synthesizes the original function from its frequency domain representation, as proven by the Fourier Inverse Theorem.

Fast Fourier Transform:- (FFT)

A fast Fourier Transform (FFT) is Algorithm that computes the discrete Fourier Transform (DFT) of a sequence as its Inverse (IDFT). Fourier Analysis converts a signal from its Original domain and vice versa. The DFT is obtained by decomposing a sequence of values into components of different frequencies. This is obtained by decomposing a sequence of values into components of different frequencies. The difference in speed can be enormous, especially for long data sets where N may be in thousands & millions.

Matlab code:-

```
Fs = 1000;  
Ts = 1/Fs;  
dt = 0:Ts:2-Ts;  
f1 = 10;  
f2 = 30;  
f3 = 70;  
y1 = 10 * sin(2 * pi * (1 * dt));  
y2 = 10 * sin(2 * pi * (2 * dt));  
y3 = 10 * sin(2 * pi * (3 * dt));
```

$$y_4 = y_1 + y_2 + y_3$$

```
subplot (4,1,1);
```

```
plot (dt, y1, "r");
```

```
subplot (4,1,2);
```

```
plot (dt, y2, "b");
```

```
subplot (4,1,3);
```

```
plot (dt, y3, "g");
```

```
subplot (4,1,4);
```

```
plot (dt, y4, "o");
```

```
nfft = length(y4);
```

```
nfft2 = 2 * nextpow2(nfft);
```

```
ff = fft(y4, nfft2);
```

```
plot (abs(ff));
```

Wavelet transform:-

A Wavelet transform is a linear transformation in which the Basis function (Except the first) are scaled and shifted versions of one function, called the "mother Wavelet". If the Wavelet can be selected to resemble components of the Image, then a compact representation results.

Implementation of Ecg signal using Matlab:-

```
sig = load ("ecg.txt");
```

```
plot (sig)
```

```
xlabel ("samples");
```

```
ylabel ("Electrical activity");
```

```
title ("ECG signal sampled at 100hz")
```

```
hold on
```

```
plot (sig, 'ro');
```