

Study of Fourier Transform and It's Application in Field of Science and Technology

Shivani Shukla¹, Jayant Varma²

¹FIRST YEAR ENGINEERING, VIVA INSTITUTE OF TECHNOLOGY, PALGHAR

Email: shuklashivani2501@gmail.com

²FIRST YEAR ENGINEERING, VIVA INSTITUTE OF TECHNOLOGY, PALGHAR

Email: jayantdiamond@gmail.com

Abstract—Present study is an effort to understand the application and modification of utility of Fourier transform. During last few decades there is a drastic improvement in study and application of Fourier transform. It is one method of mathematics which helps to study of converting image domain signal into signal domain or vice versa. Now its study is important for any type of signal transmission of video, audio, picture electronics telecommunication, clarity of cameras, etc. It has very large application such as in filtering, radar, communication, etc. its study may help us to understand the topic clearly which can lead to innovate something new signal transmission only

Keywords—Audio, Filtering, Fourier transform, Radar, Signal transmission, Video

I. INTRODUCTION

Fourier transform helps us to look at the complicated image domain in a simple way through signal domain. In this way it occupies less memory to perform a pile of work. FT is used in almost all types of signal transformation of any form such as phone, internet, radar, connection, walky-talky, filtering technology, etc. Fourier transform is modification of Fourier series. Indeed there are three types of transform viz series, Fourier, and Laplace. Fourier transform is a mathematical tool which converts the time domain in frequency domain. There the Fourier transform is itself divided into number of parts. There is requirement of bandwidth to transmit the signal and bandwidth can be calculated in domain of frequency only.

Condition for existence of Fourier series is as follows:

- 1.1. It should be of finite range in absolute integral
- 1.2. Function should have finite maxima and minima
- 1.3. Function should have finite discontinuity

II. Basic theory in Fourier transforms

Fourier transform is derived from the Fourier series where the functions are basically required to be periodic but in Fourier transform function can be aperiodic. There are many formulas for Fourier transform and here one of them is:

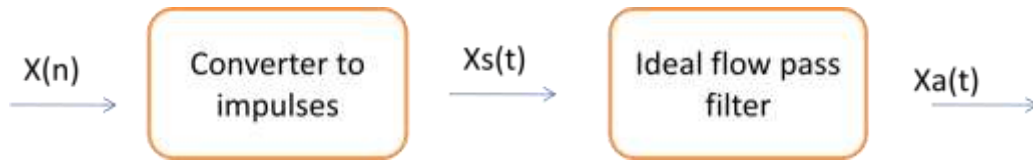
$$f(\delta) = \int_{-\infty}^{\infty} f(x)e^{-2\pi ix\delta} dx$$

Over here $-ve$ sign has a special meaning because $+ve$ of exponent and $-ve$ makes it 1 which is required

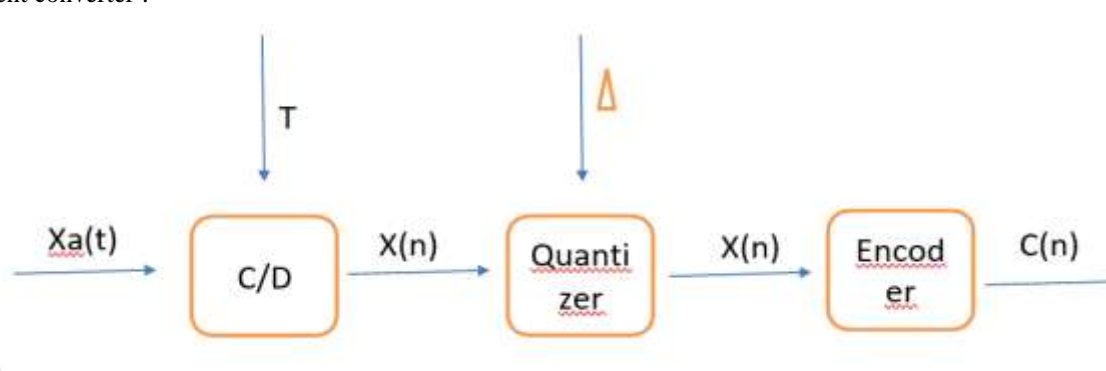
III. DATA SAMPLING

It is the statistical study of sample collected and read by a Fourier transform and making its output. In Fourier transform during data sampling there is use of digital to analog converter and analog to digital converter. In Fourier transform there is use of digital to analog converter and analog to digital converter. We need it because there is somewhere we require digital and sometimes we require analog. Like for our computer, mobile working we need the signals in form of digital, because they work and understand digital signals but on the same hand we require the analog signals because digital signals cannot be transmitted in the air and analog can be transmitted through air medium

D/A component converter:



A/D component converter :







IV. Application

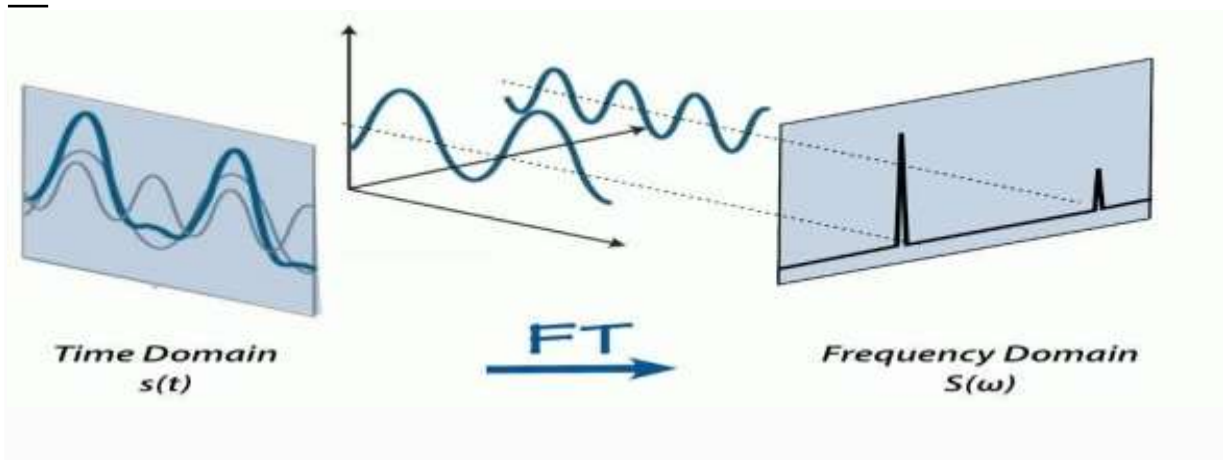
4.1 Filter-- The application of Fourier transform are in signal processing audio and visual transmission telecommunications, speech processing, hearing aids, electrocardiographs ,etc. The MATLAB is software which helps to implement the signal processing system on computer, so that we can verify the function of signal processing and rectify the problem. The radar echo contains several of information in the signal form. This information is convicted by Fourier transformation into data transformation which can be used by the computing aided signal processing.

4.2 Sound Editing--The Fourier transform study has an ability to convert the noise in sound. Fourier transform is a mathematical funnel where we feed the raw wave or basic equation with so many disturbances and it converts it into a required wave or equation. The audacity is a software application which is constructed with mathematical equation of Fourier transform. Its help to separate the desired notes of sound with undesired notes of noise.

4.3 Cell Phones-- Each and every cell phone has a unique number and which contains its unique IP address. IP stands for internet protocol. Where protocol means set of rules. The device has to use the co-ordinators which is developed in receiver, transmitter and satellite to receive and transmit to other end .The converter at the end to convert voice message into electrical impulse and vice-versa. The messages transmits in binary i.e. in '0' and '1'.The message transmission done through machine learning language i.e. it works on either true or false condition.

IV.RESULT

Type of Transform	Example Signal
Fourier Transform <i>signals that are continuous and aperiodic</i>	
Fourier Series <i>signals that are continuous and periodic</i>	
Discrete Time Fourier Transform <i>signals that are discrete and aperiodic</i>	
Discrete Fourier Transform <i>signals that are discrete and periodic</i>	



This effort makes a realization that Fourier transform is the basic for all types of signal transformation. To study and develop it we need a good understanding of mathematics. Only because of its study we were able to make signal possible to transmit with help of wire and later on with help of that only we replaced that wire with wireless connections. It may possible that with help of this we can make more dynamic things possible in future.

V. Conclusion

The proposed Fourier transform has a wide range of help in various domains like power distribution system, wireless, signal processing, cell phone manufacturing, mechanical and industrial application. In power system, proposed method easily analyzes the faults, harmonics and disturbance.

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