lab 9 report 19L1316:

**INTRODUCTION:-**

Fourier analysis is a type of mathematical analysis that attempts to identify patterns or cycles in a time series data set which has already been normalized. The Trigonometric Fourier Series is an example of Generalized Fourier Series with sines and cosines substituted in as the orthogonal basis set. Thus a function or signal f(t) with period T0 can be expressed as [0 < t < T0]. The Fourier series represents periodic, continuous-time signals as a weighted sum of continuous-time sinusoids. It is widely used to analyze and synthesize periodic signals. Fourier transform of a periodic signal having the Fourier series coefficients is a train of impulses, occurring at multiples of the fundamental frequency, the strength of the impulse at being.

**OBJECTIVE:-**

The main objective of this experiment is:

* Decomposition of a periodic signal into its Trigonometric Fourier series coefficients.
* Plotting of magnitude and phase spectra using trigonometric coefficients.

**APPLICATIONS:-**

* Fourier analysis has many scientific applications – in physics, partial differential equations, number theory, combinatorics, signal processing, digital image processing, probability theory, statistics, forensics, option pricing, cryptography, numerical analysis, acoustics, oceanography, sonar, optics, diffraction.
* It seeks to simplify complex or noisy data by decomposing it into a series of trigonometric or exponential functions, such as sine waves.
* They can equally be applied to analyze spatial frequencies, and indeed for nearly any function domain.

**ISSUES:-**

i face no issue in this lab.

**CONCLUSION:-**

I have learnt how to decompose a periodic signal into its trigonometric fourier series coefficients and how to plot magnitude and phase spectra using trigonometric coefficients.

**POSTLAB**

n=[1:10];

a0=0;

an=[0 0 0 0 0 0 0 0 0 0];

bn=[8./((n.^2).\*(pi.^2))].\*[sin(n.\*(pi./2))];

an2=0;

bn2=bn.^2;

cn=sqrt(an2+bn2);

cn=[0 cn];

thetha=atan(-bn./an);

thetha=[0 thetha];

n=[1:10];

subplot(211), stem(n, an,'o');

title('AN');

ylabel('y-axis');

grid;

subplot(212),stem(n, bn);

title('BN');

ylabel('y-axis');

grid;