

S. Y. B. Tech. (Electrical and Computer Engineering)

Semester: IV

Subject: Electrical Circuit Analysis

Name: ghraerang mhatre

Class:

Roll No: 29

Batch: A2

Experiment No: 05

Name of the Experiment: Finding even and odd part of the signal using MATLAB.

Performed on: 27/9/22

Submitted on: 4/10/22

Marks	Teacher's Signature with Date

Aim: To find even and odd part of the signal.

Prerequisite: Knowledge of signal generation using MATLAB.

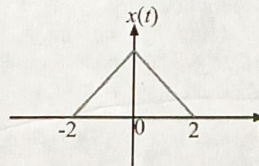
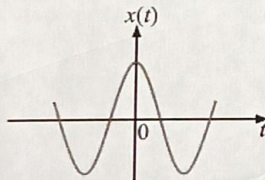
Theory:

One of characteristics of signal is symmetry that may be useful for signal analysis. Even signals are symmetric around vertical axis, and Odd signals are symmetric about origin.

Even Signal: A signal is referred to as an even if it is identical to its time-reversed counterparts, that is, it is symmetrical about vertical axis.

$$x(t) = x(-t); \text{ for all } t \quad \dots \text{ continuous time signal}$$

$$x(n) = x(-n); \text{ for all } n \quad \dots \text{ discrete time signal}$$



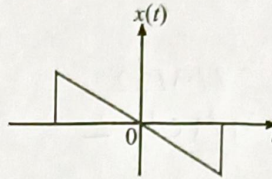
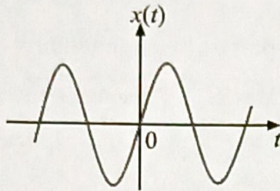
To find out the even part,

$$X_e(t) = \frac{x(t) + x(-t)}{2}$$

Odd Signal: An odd signal must be 0 at $t=0$, in other words, odd signal passes through the origin.

$$x(-t) = -x(t); \text{ for all } t \quad \dots \text{ continuous time signal}$$

$$x(-n) = -x(n); \text{ for all } n \quad \dots \text{ discrete time signal}$$



To find out the odd part,

$$X_o(t) = \frac{x(t) - x(-t)}{2}$$

Procedure:

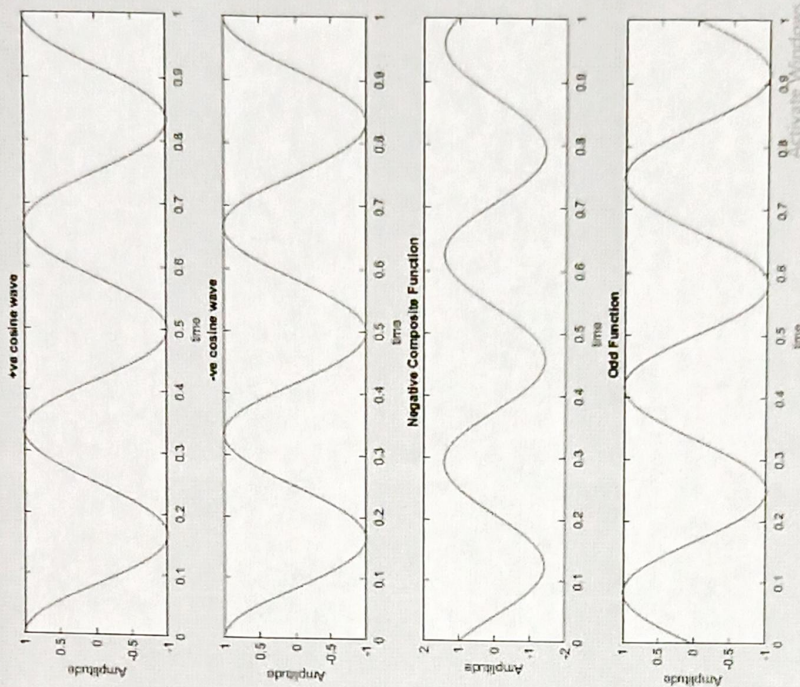
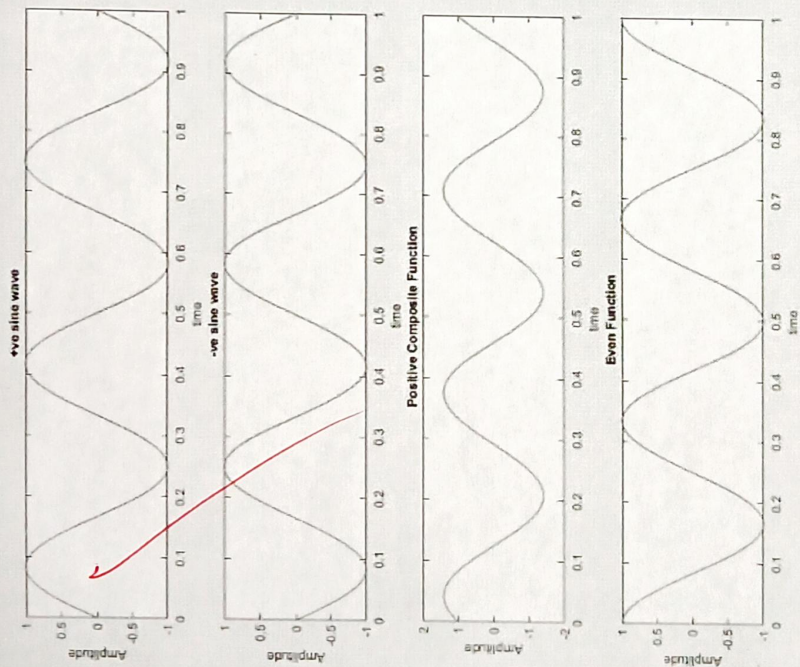
1. Open MATLAB
2. Open new M-file
3. Generate a sine waveforms of any particular two frequency.
4. Generate a cos waveforms of the same frequency as above.
5. Add calculation of point 3 and 4 in a variable.
6. Generate sine and cos wave from point 3 and 5 for negative time.
7. Add the negative time sine and cos wave from point 6 and save in different variable.
8. Find out even and odd part of above composite waveforms using the formulae given in the theory.
9. Display all the results from point 3 onwards using function "subplot."
10. Save in current directory
11. Compile and Run the program
12. For the output see command Figure window

Activity:

Attach screenshots of above activity.

Post Lab Questions:

1. List out properties of even signals.
2. List out properties of odd signals.



* Post Lab Questions.

Q 1) List out properties of even signals

→ The Properties of even signals are -

- ① The even signals are symmetrical about the vertical axis.
- ② The value of an even signal at time (t) is same as at time $(-t)$.
- ③ The even signal is identical with its reflection about the origin.
- ④ Area under the even signal is two times of its one side area.

Q 2) List out properties of odd signals.

→ The Properties of odd signals are -

- ① The odd signal is antisymmetric about the origin.
- ② The value of odd signal at time (t) is negative of its value at time $(-t)$ for all t , i.e. $-\infty < t < \infty$.
- ③ The odd signal must necessarily be zero at time $t=0$ to hold $x(0) = -x(0)$.
- ④ Area under the odd signal is always zero.

Mu
4/16/22