

# PROJECT SYNOPSIS

**COURSE NAME : IT WORKSHOP – 3**

**COURSE CODE : CSP211**

**PROJECT TITLE : GENERATION OF SINE AND COSINE WAVES IN 2 D AND 3 D**

**LANGUAGE : PYTHON**

## **LIBRARIES IMPORTED :**

- 1. MATPLOTLIB .PYPLOTS**
- 2. MPLOT3D FROM MPL\_TOOLKITS**
- 3. NUMPY**
- 4. TKINTER**

**MATPLOTLIB :** Matplotlib is a python 2D plotting library which helps in producing publication quality figures in a variety of hardcopy formats and interactive environments across platforms . Matplotlib has several tools for plotting normal 2D graphs for depiction of various functional graphs and comparing their relationship.

**MPLPLOT3D** : Mplot3D toolkit adds simple 3D plotting capabilities to matplotlib by supplying an axes object that can create a 2D projection of a 3D scene .The resulting graph will have the same look and feel as regular 2D plots . One can draw various graphs like contour graph , wire frames , surface plots etc.

**NUMPY** : NumPy is the fundamental package for scientific computing with Python. It contains among other things like a powerful N dimensional object , sophisticated functions like trigonometric , logarithmic , exponential etc . It also is useful for linear algebra , Fourier transform and random number capabilities.

**TKINTER** : It is a standard python interface to the Tk GUI toolkit. Tkinter consists of a number of modules. It helps widely in making of GUI based programs and projects as it helps the user to add frames to their project with all the important styling that goes with it . It has its different set of colour chart which is different from other libraries like matplotlib ,etc.

# ABOUT THE PROJECT :

This project is all about generation of sine and cosine waves in 2D and 3D depending upon the values entered by the user . It asks for the various node points on the x axis ( which is considered as the reference axis ) which will decide the nature of graph and its orientation . There is a GUI frame which will contain the entry details for the nature of both graphs . After submitting the details , user will get the desired graph which can be viewed in any orientation as wanted . Also the 2D graph can be magnified to see the slightest of changes in curvature . As for the 3D graph is considered , user can experience the motion of helix by changing the view angle simply by moving the cursor . These features are supported by the toolkits from matplotlib , mplot3D , and the GUI work by Tkinter . The predefined functions of sine and cosine have been used by importing NumPy .

The next few pages show the output frames of the project .

## ENTER THE FOLLOWING DETAILS TO SEE GRAPHS :-

## 2 D GRAPH DEPICTION :

Enter the starting coordinate of x axis in your graph :

Enter the factor of pi as the final coordinate in your graph :

enter the scaling factor on the x axis :

SUBMIT

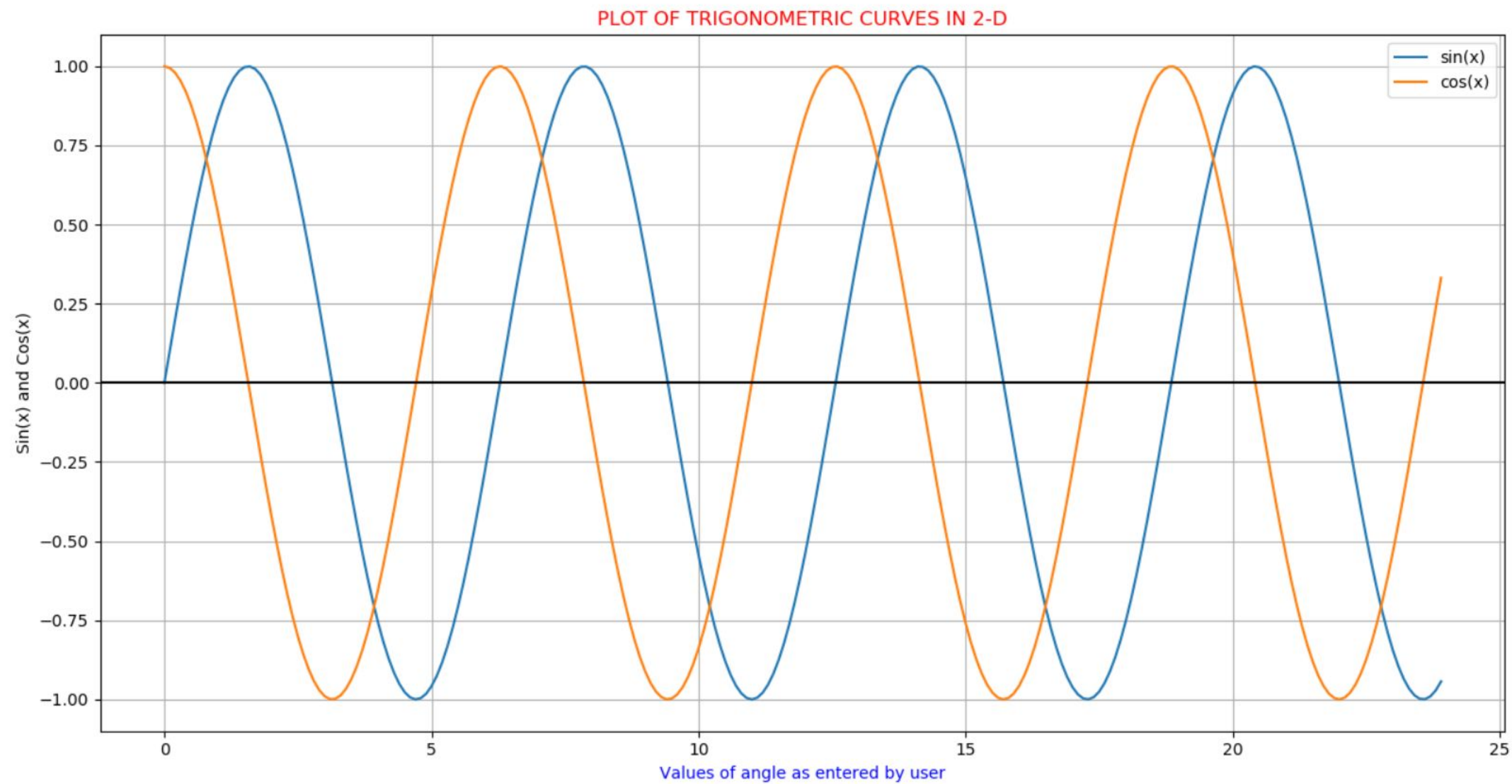
## 3 D GRAPH DEPICTION :

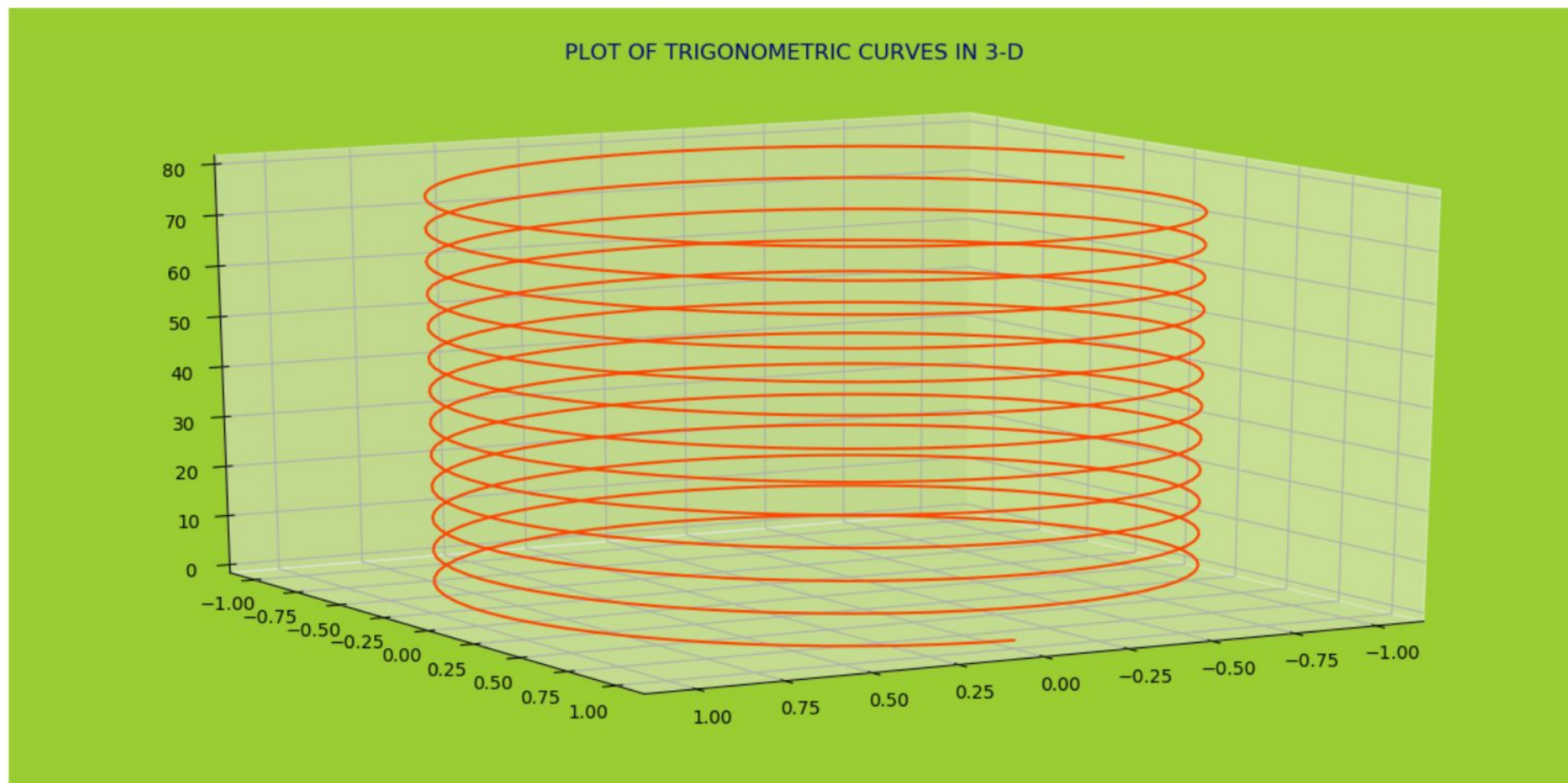
Enter the starting coordinate on the x axis of your graph :

Enter the final coordinate on the x axis of your graph :

Enter the no. of scattered points to be for graph formation :

SUBMIT





## **FUTURE APPLICATIONS :**

1. The plots can be really helpful the comparative study of the sine and cosine graphs . Their curvature , their periodicity , etc. The 2D plot can be served as the basis for the study of harmonic motion equations .
2. The 3D plot has its wide application in serving the study of helix structures , it can also be used in electromagnetic induction theory by showing the relation of electric fields and magnetic fields with the current applied .

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