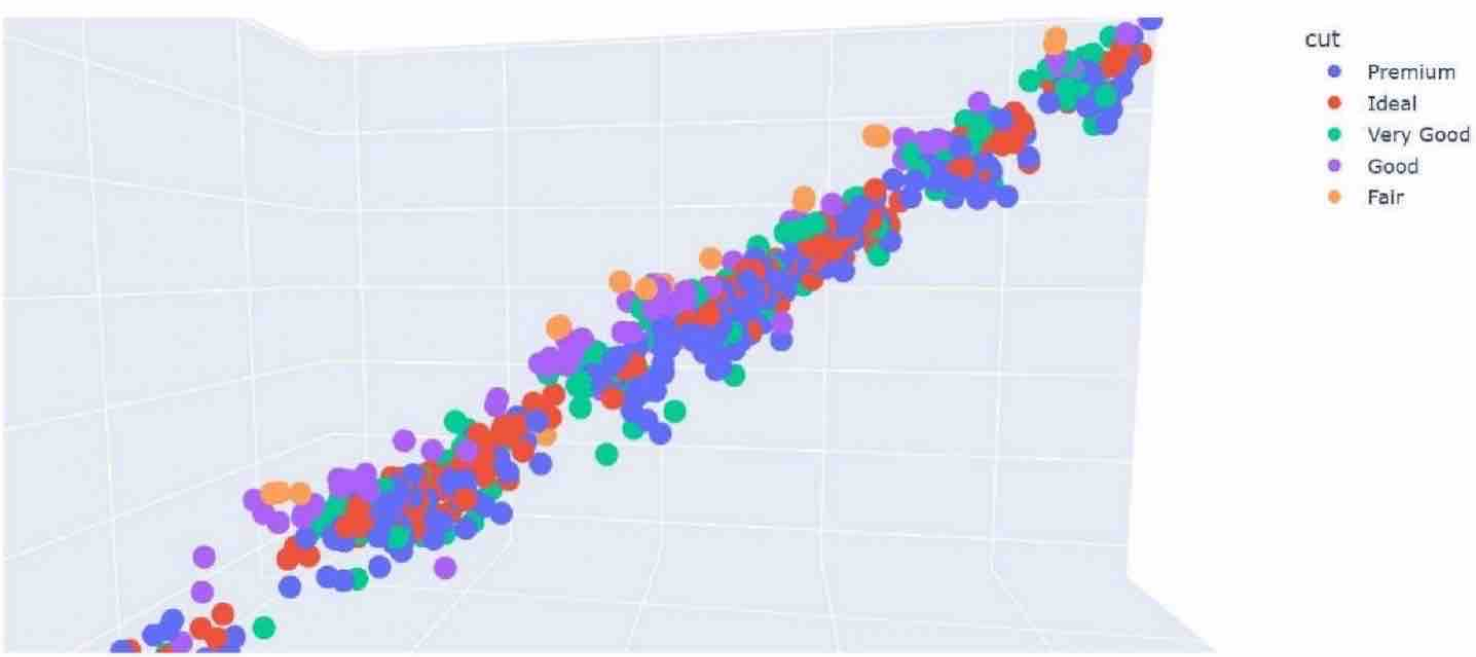
3D Graphs using

VANSH DAHIYA

```
import numpy as np
import plotly.express as px


fig = px.scatter_3d(df, x='x', y='y', z='z')

fig.show()
```



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1. Scatter plot

Scatterplot are used for visualize the relation between continuous numerical data

2. Bubble plot

Bubble plot is a variation of scatterplot used for categorical or discrete numerical data.

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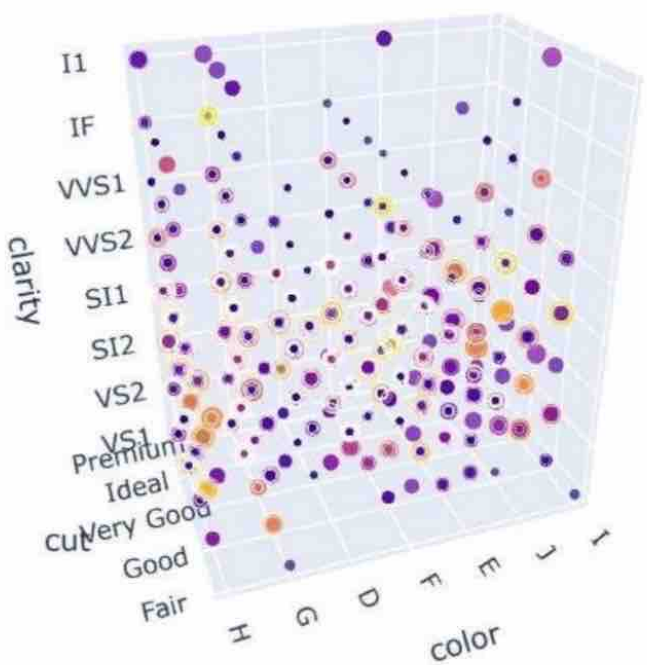
```
import numpy as np
import plotly.express as px


fig = px.scatter_3d(df, x='cut', y='color', z='clarity',
                    color='carat', size='price')

fig.show()
```



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3. Line plot

Line plots are used to represent a trend. For example, how the data change over the year

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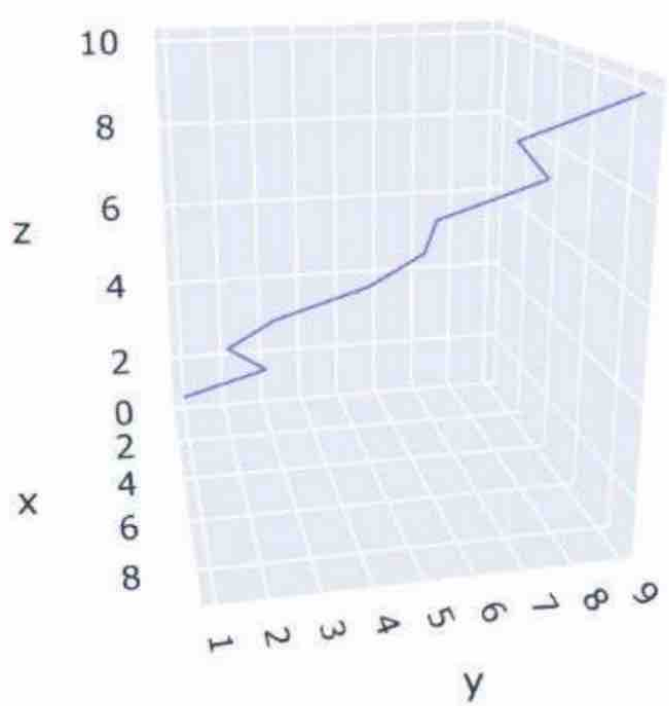
```python
import numpy as np
import plotly.express as px

'''some random data'''
x = np.arange(0, 10, 1)
y = [1,3,2,3,5,6,6,8,7,9]
z = [1,2,3,4,5,6,7,8,9,10]

'''creating the figure'''
fig = px.line_3d(x=x, y=y, z=z)
fig.show()
```



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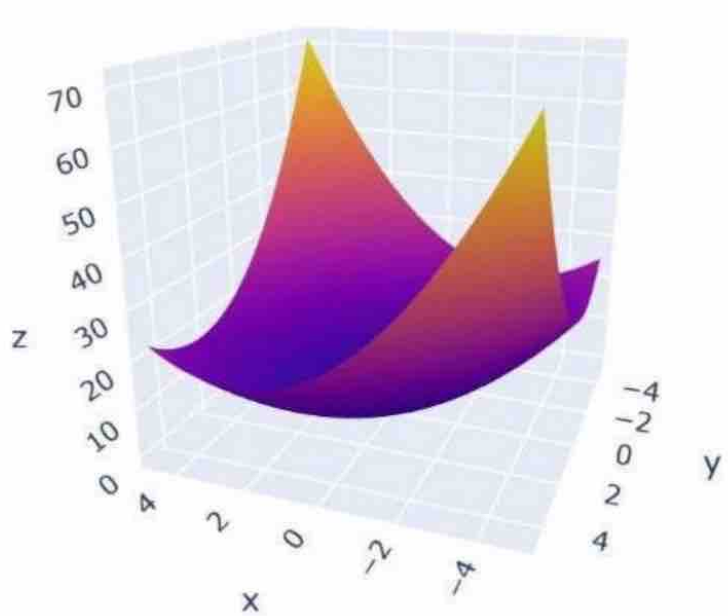
```python
import numpy as np
import plotly.graph_objects as go

'''creating the grid'''
x = np.arange(-5, 5, 0.25)
y = np.arange(-5, 5, 0.25)

X, Y = np.meshgrid(x, y)
Z = X ** 2 + Y ** 2 - X * Y

'''creating the figure'''
surface = go.Surface(x=X, y=Y, z=Z)
fig = go.Figure(surface)
fig.show()
```



4. Surface plot

Surface plot are commonly used to visualize mathematical function and to do geospatial analysis.

It is only available in the graph_objectsmodule

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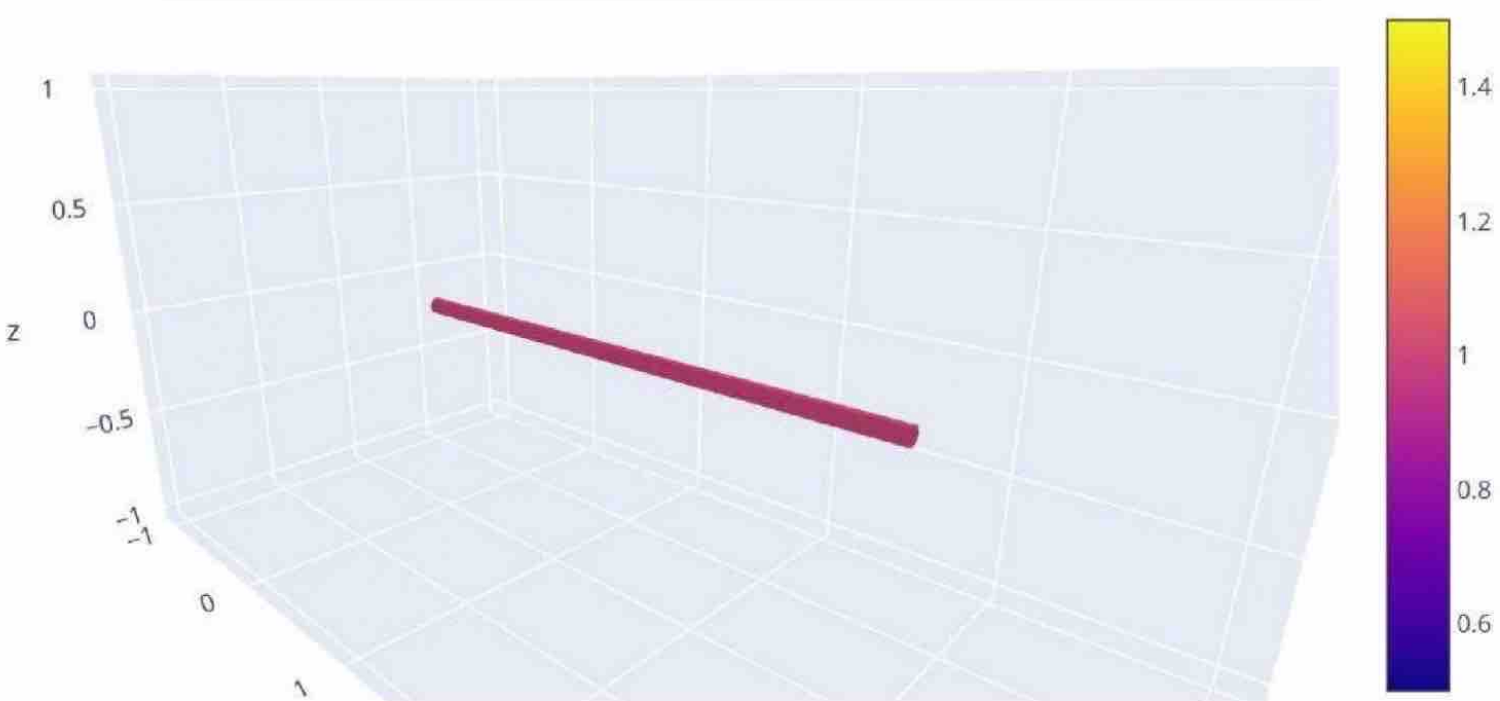
```
import plotly.graph_objects as go

fig = go.Figure(data=go.Streamtube(x=[0, 0, 0],
                                   y=[0, 1, 2],
                                   z=[0, 0, 0],
                                   u=[0, 0, 0],
                                   v=[1, 1, 1],
                                   w=[0, 0, 0]))
fig.show()
'''code and figure from plotly.com'''
```



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5.Streamtube plot

Streamtubechartare usedto representthe flow or the vector field. It is commonly used in the field of computational fluids dynamics

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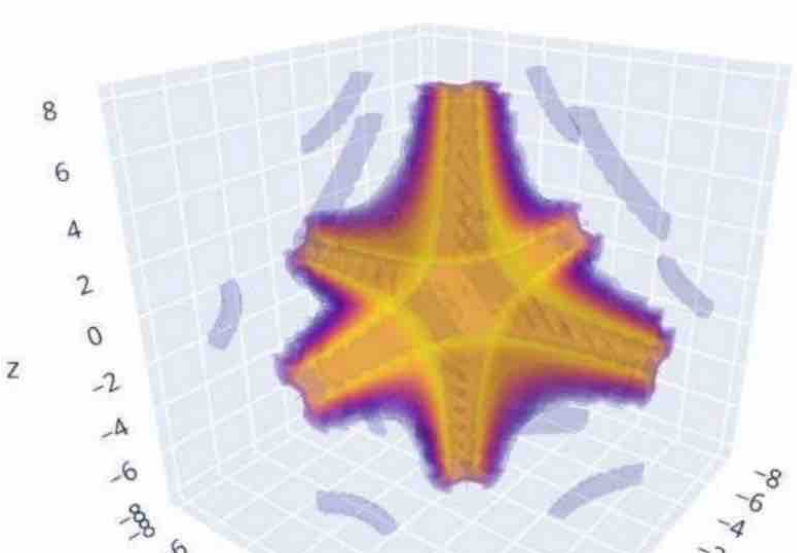
```python
import plotly.graph_objects as go
import numpy as np
X, Y, Z = np.mgrid[-8:8:40j, -8:8:40j, -8:8:40j]
values = np.sin(X*Y*Z) / (X*Y*Z)

fig = go.Figure(data=go.Volume(
    x=X.flatten(),
    y=Y.flatten(),
    z=Z.flatten(),
    value=values.flatten(),
    isomin=0.1,
    isomax=0.8,
    opacity=0.1,
    surface_count=17))
fig.show()

'''code and figure from plotly.com'''
```



6. Volume Charts

Volume chartare usedto represent figurein 3 dimensions. They are similar with isobar charts but with more transparency.

7. Trisurfaceplots

They are used to represent the figure witha meshof triangles.
They are particularly useful when dealing with irregular or sparse data and enable the exploration and analysis of complex surface structures.

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```
import plotly.figure_factory as ff
import numpy as np
from scipy.spatial import Delaunay

u = np.linspace(0, 2*np.pi, 20)
v = np.linspace(0, 2*np.pi, 20)
u,v = np.meshgrid(u,v)
u = u.flatten()
v = v.flatten()

x = (3 + (np.cos(v)))*np.cos(u)
y = (3 + (np.cos(v)))*np.sin(u)
z = np.sin(v)

points2D = np.vstack([u,v]).T
tri = Delaunay(points2D)
simplices = tri.simplices

fig = ff.create_trisurf(x=x, y=y, z=z,
                        simplices=simplices,
                        title="Torus",
                       aspectratio=dict(x=1, y=1, z=0.3))
fig.show()

'''code and figure from plotly.com'''
```

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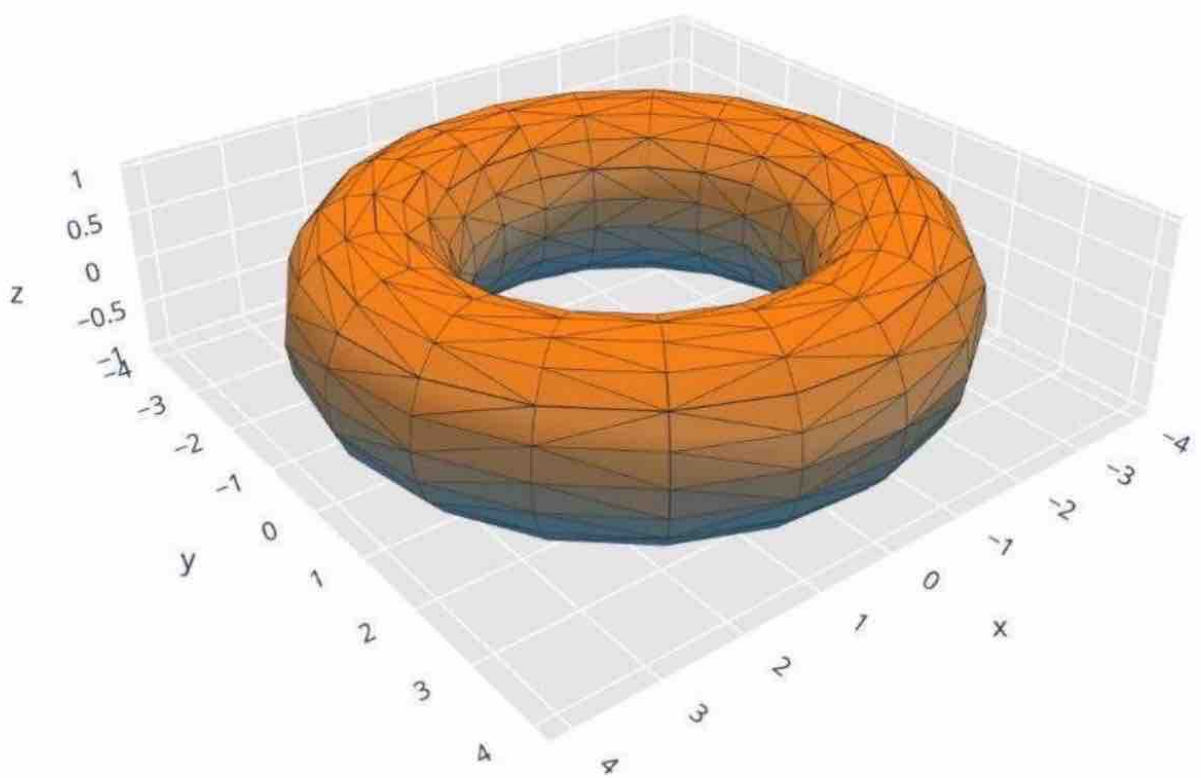

Thank for reading until the end

For more information, check the official documentation at plotly.com/python/3d-charts

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