

NAME = PANKAJ KUMAR SAINI

ROLL NO = 2019IMG-044

CG LAB ASSIGNMENT-1

TASK-1 A

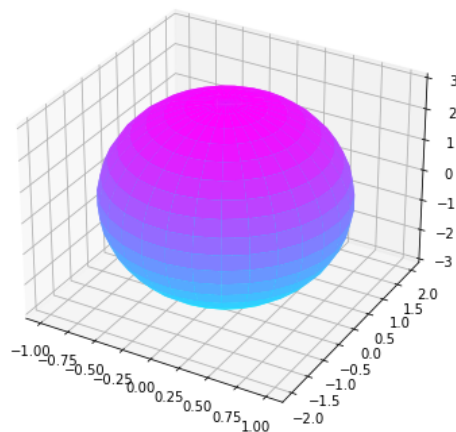
ELLIPSOID

(BELOW PHOTO CONTAIN CODE AND PHOTO FOR ELLIPSOID)

```
In [17]: import matplotlib.pyplot as plt
import numpy as np

a, b, c = 1,2,3

plt.rcParams["figure.figsize"] = [10.00, 5.00]
plt.rcParams["figure.autolayout"] = True
fig = plt.figure()
ax = fig.add_subplot(projection='3d')
u, v = np.mgrid[0:2 * np.pi:30j, 0:np.pi:20j]
x = (np.cos(u) * np.sin(v))*a
y = (np.sin(u) * np.sin(v))*b
z = (np.cos(v))*c
ax.plot_surface(x, y, z, cmap='cool')
plt.show()
```



In []:

TASK-1 B

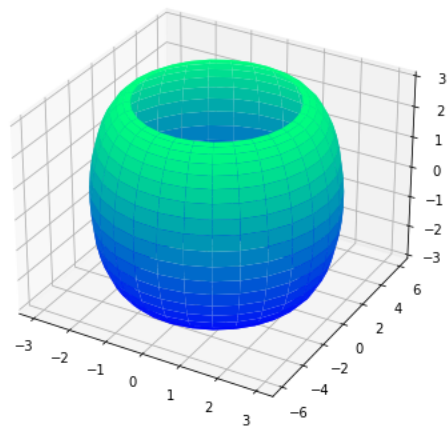
TORUS

(BELOW PHOTO CONTAIN CODE AND PHOTO FOR ELLIPSOID)

```
In [18]: import matplotlib.pyplot as plt
import numpy as np

a, b, c, r = 1,2,3,2

plt.rcParams["figure.figsize"] = [10.00, 5.00]
plt.rcParams["figure.autolayout"] = True
fig = plt.figure()
ax = fig.add_subplot(projection='3d')
u, v = np.mgrid[0:2 * np.pi:30j, 0:np.pi:20j]
x = a * (r + np.sin(v))*np.cos(u)
y = b * (r + np.sin(v))*np.sin(u)
z = c * np.cos(v)
ax.plot_surface(x, y, z,cmap='winter')
plt.show()
```



In []:

TASK 2 SUPER-ELLIPSOID

**HERE I AM PASTING ONLY ONE CODE AND IT IS SAME FOR ALL
GRAPH. WE JUST CHANGED THE VALUES OF S1 AND S2 AND
REMAINING CODE IS SAME FOR ALL SCREENSHOTS**

Computer Graphics - Jupyter Notebook

localhost:8888/notebooks/Desktop/Computer%20Graphics.ipynb

Programming Web-D Online judges GFG Music Tube Projects ideas CP SM DaybyDay DSA PraticerandomT2FOther bookmarksReading list

jupyter Computer Graphics Last Checkpoint: 4 hours ago (unsaved changes)

Python 3

Logout

File Edit View Insert Cell Kernel Widgets Help

Run

Code

```
In [20]: import matplotlib.pyplot as plt
import numpy as np
a, b, c = 1,2,3
s1,s2 = 1,0.2

plt.rcParams["figure.figsize"] = [10.00, 5.00]
plt.rcParams["figure.autolayout"] = True
fig = plt.figure()
ax = fig.add_subplot(111,projection='3d')

v,u = np.mgrid[-0.5*np.pi:0.5 * np.pi:100j, -1*np.pi:1*np.pi:100j]
x = ((np.abs(np.cos(u)))**s2 * np.sin(v)**s1)*a
y = ((np.abs(np.sin(u)))**s2 * np.sin(v)**s1)*b
z = (np.cos(v)**s1)*c

ax.plot_surface(x, y,z, alpha = 1, rstride=1, cstride=1, cmap="cool", linewidth=0.5, antialiased=True, zorder = 0.3)
ax.plot_surface(-x, y,z, alpha = 1, rstride=1, cstride=1, cmap="cool",linewidth=0.5, antialiased=True, zorder = 0.3)
ax.plot_surface(x, -y,-z, alpha = 1, rstride=1, cstride=1, cmap="cool",linewidth=0.5, antialiased=True, zorder = 0.3)
ax.plot_surface(x, y,-z, alpha = 1, rstride=1, cstride=1, cmap="cool",linewidth=0.5, antialiased=True, zorder = 0.3)

ax.view_init(20,10)
plt.show()

plt.rcParams["figure.figsize"] = [10.00, 5.00]
plt.rcParams["figure.autolayout"] = True
fig = plt.figure()
ax = fig.add_subplot(111,projection='3d')

v,u = np.mgrid[-0.5*np.pi:0.5 * np.pi:100j, -1*np.pi:1*np.pi:100j]
x = ((np.abs(np.cos(u)))**s2 * np.sin(v)**s1)*a
y = ((np.abs(np.sin(u)))**s2 * np.sin(v)**s1)*b
z = (np.cos(v)**s1)*c

ax.plot_surface(x, y,z, alpha = 1, rstride=1, cstride=1, cmap="cool", linewidth=0.5, antialiased=True, zorder = 0.3)
ax.plot_surface(-x, y,z, alpha = 1, rstride=1, cstride=1, cmap="cool",linewidth=0.5, antialiased=True, zorder = 0.3)
ax.plot_surface(x, -y,-z, alpha = 1, rstride=1, cstride=1, cmap="cool",linewidth=0.5, antialiased=True, zorder = 0.3)
ax.plot_surface(x, y,-z, alpha = 1, rstride=1, cstride=1, cmap="cool",linewidth=0.5, antialiased=True, zorder = 0.3)

ax.view_init(10,60)
plt.show()
```

11:57

24-09-2021

**ABOVE CODE IS FOR SUPER ELLIPSOID
HERE WE WILL CHANGE THE VALUES OF S1 AND S2 AND
WILL GET DIFFERENT VARIATIONS**

**AND WE ARE PLOTTING 2 GRAPH IN ONE SCREENSHOT
BOTH GRAPH ARE FROM DIFFERENT ANGLE**

**FIRST VIEW FROM (20,10)
SECOND VIEW FROM(10,60)**

WHEN $S_1=1$ AND $S_2=0.2$

Computer Graphics - Jupyter Notebook

localhost:8888/notebooks/Desktop/Computer%20Graphics.ipynb

Other bookmarksReading list

Computer Graphics

Last Checkpoint: 4 hours ago (unsaved changes)

Logout

FileEditViewInsertCellKernelWidgetsHelp

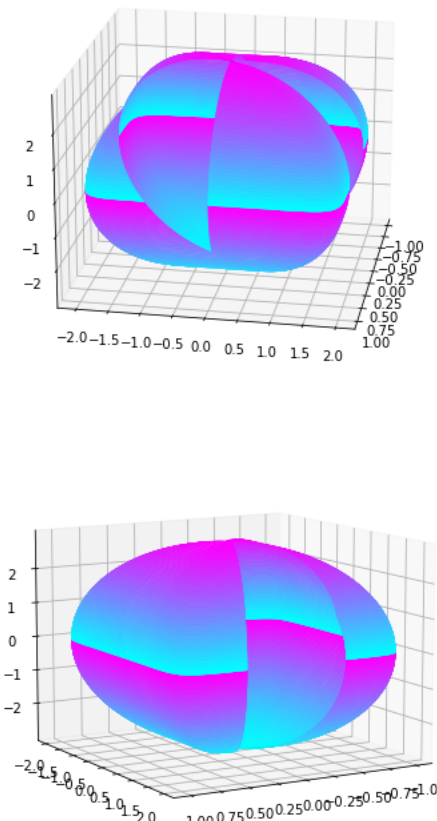
TrustedPython 3

Run

Code

```
ax.plot_surface(x, -y, -z, alpha = 1, rstride=1, cstride=1, cmap="cool", linewidth=0.5, antialiased=True, zorder = 0.3)
ax.plot_surface(x, y, -z, alpha = 1, rstride=1, cstride=1, cmap="cool", linewidth=0.5, antialiased=True, zorder = 0.3)

ax.view_init(10,60)
plt.show()
```



Windows Taskbar

System Tray

WHEN $S_1=1$ AND $S_2=0.4$

Computer Graphics - Jupyter Notebook

localhost:8888/notebooks/Desktop/Computer%20Graphics.ipynb

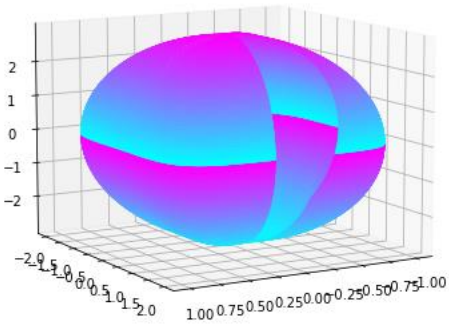
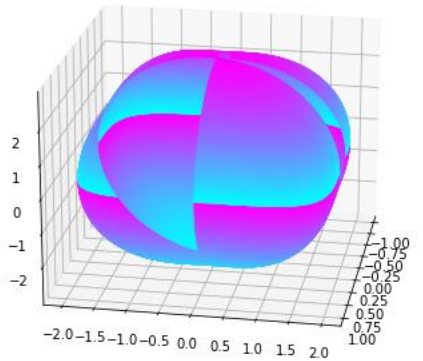
ProgrammingWeb-DOnline judgesGFGMusic TubeProjects ideasCPSMSDaybyDayDSAPracticeRandomT2FOther bookmarksReading list

jupyter Computer Graphics Last Checkpoint: 4 hours ago (unsaved changes)

Python 3

FileEditViewInsertCellKernelWidgetsHelp

RunCode



In []:

11:58 24-09-2021

WHEN $S_1=1$ AND $S_2=0.8$

Computer Graphics - Jupyter No

+

localhost:8888/notebooks/Desktop/Computer%20Graphics.ipynb

Other bookmarks

Reading list

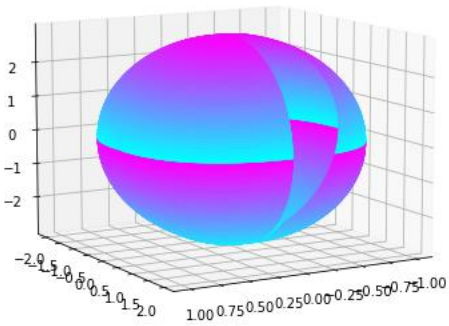
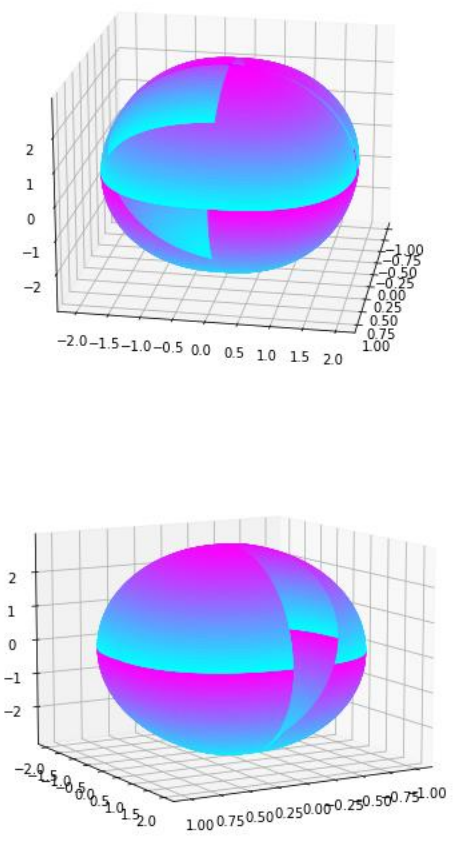
jupyter Computer Graphics Last Checkpoint: 4 hours ago (autosaved)

Python 3

Logout

File Edit View Insert Cell Kernel Widgets Help

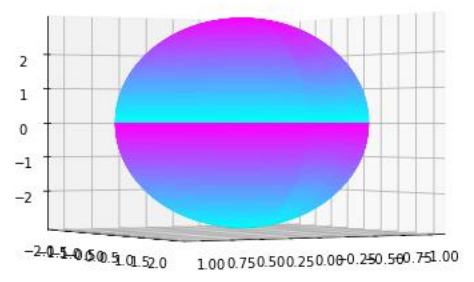
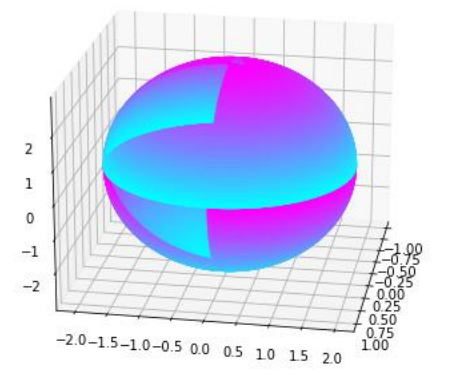
Code



In []:

11:59 24-09-2021

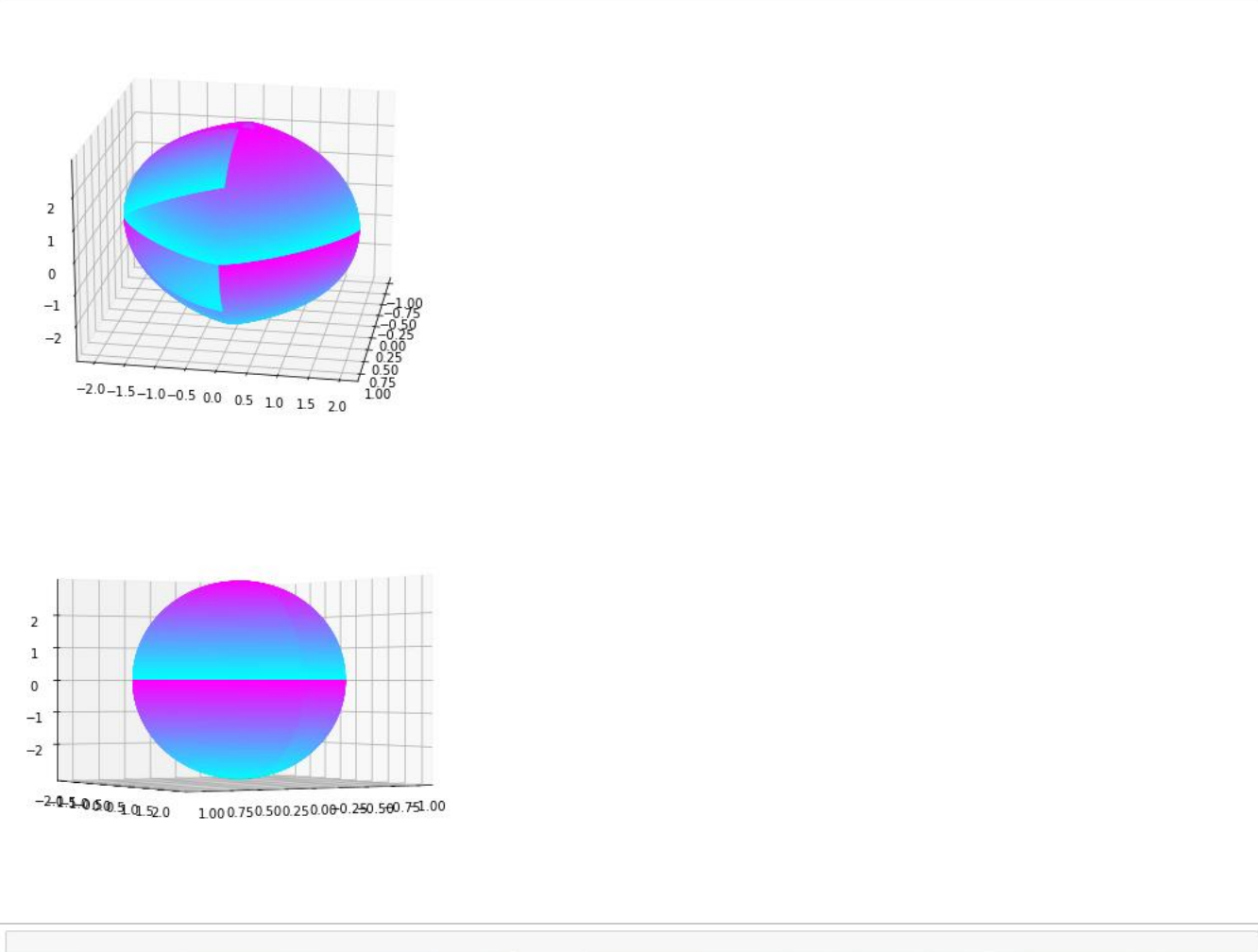
WHEN S1=1 AND S2=1



In []:

WHEN $S_1=1$ AND $S_2=1.5$

python3



WHEN S1=1 AND S2=2

Computer Graphics - Jupyter Notebook

localhost:8888/notebooks/Desktop/Computer%20Graphics.ipynb

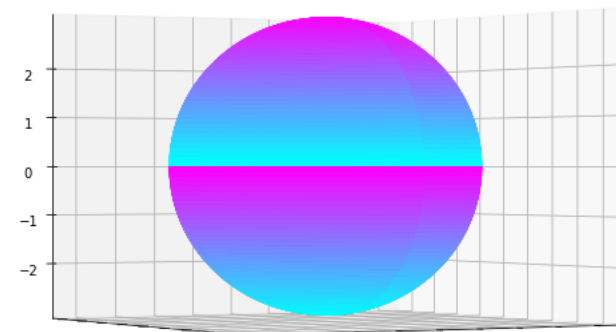
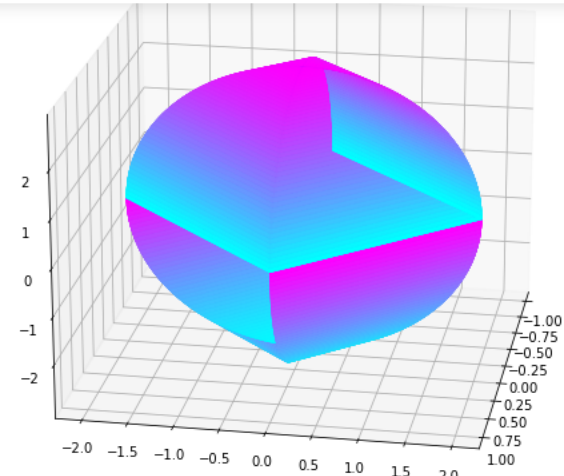
ProgrammingWeb-DOnline judgesGFGMusic TubeProjects ideasCPSMSDaybyDayDSAPracticeRandomT2FOther bookmarksReading list

jupyter Computer Graphics Last Checkpoint: 4 hours ago (unsaved changes)

Python 3

FileEditViewInsertCellKernelWidgetsHelp

RunCode



12:11 24-09-2021

ABOVE ALL GRAPH ARE FOR TASK 2 A

AND NOW FROM HERE WE WILL START TASK 2 B

AGAIN CODE IS ALSO SAME
JUST CHANGING VALUES OF S1 AND S2

IN TASK B S2 =1 IS FIX AND S1 WILL CHANGE

```
In [39]: import matplotlib.pyplot as plt
import numpy as np
a, b, c = 1,2,3
s1,s2 = 0.2,1

plt.rcParams["figure.figsize"] = [10.00, 5.00]
plt.rcParams["figure.autolayout"] = True
fig = plt.figure()
ax = fig.add_subplot(111,projection='3d')

v,u = np.mgrid[-0.5*np.pi:0.5 * np.pi:100j, -1*np.pi:1*np.pi:100j]
x = (np.cos(u)**s2 * (np.abs(np.sin(v)))**s1)*a
y = (np.sin(u)**s2 * (np.abs(np.sin(v)))**s1)*b
z = ((np.abs(np.cos(v)))**s1)*c
ax.plot_surface(x, y,z, alpha = 1, rstride=1, cstride=1, cmap="cool", linewidth=0.5, antialiased=True, zorder = 0.3)
ax.plot_surface(-x, y,z, alpha = 1, rstride=1, cstride=1, cmap="cool",linewidth=0.5, antialiased=True, zorder = 0.3)
ax.plot_surface(x, -y,-z, alpha = 1, rstride=1, cstride=1, cmap="cool",linewidth=0.5, antialiased=True, zorder = 0.3)
ax.plot_surface(x, y,-z, alpha = 1, rstride=1, cstride=1, cmap="cool",linewidth=0.5, antialiased=True, zorder = 0.3)

ax.view_init(20,10)
plt.show()

plt.rcParams["figure.figsize"] = [10.00, 5.00]
plt.rcParams["figure.autolayout"] = True
fig = plt.figure()
ax = fig.add_subplot(111,projection='3d')

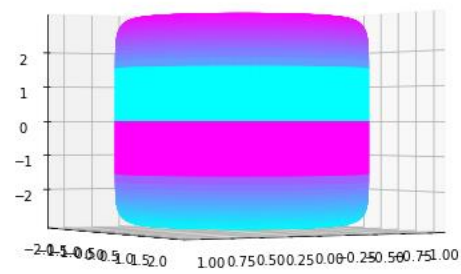
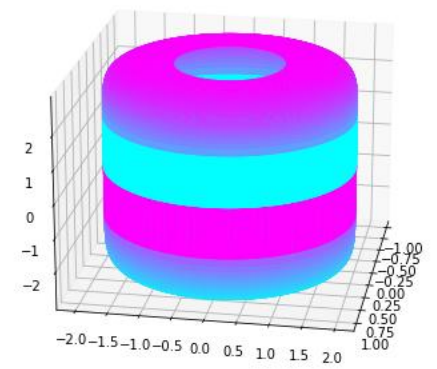
v,u = np.mgrid[-0.5*np.pi:0.5 * np.pi:100j, -1*np.pi:1*np.pi:100j]
x = (np.cos(u)**s2 * (np.abs(np.sin(v)))**s1)*a
y = (np.sin(u)**s2 * (np.abs(np.sin(v)))**s1)*b
z = ((np.abs(np.cos(v)))**s1)*c

ax.plot_surface(x, y,z, alpha = 1, rstride=1, cstride=1, cmap="cool", linewidth=0.5, antialiased=True, zorder = 0.3)
ax.plot_surface(-x, y,z, alpha = 1, rstride=1, cstride=1, cmap="cool",linewidth=0.5, antialiased=True, zorder = 0.3)
ax.plot_surface(x, -y,-z, alpha = 1, rstride=1, cstride=1, cmap="cool",linewidth=0.5, antialiased=True, zorder = 0.3)
ax.plot_surface(x, y,-z, alpha = 1, rstride=1, cstride=1, cmap="cool",linewidth=0.5, antialiased=True, zorder = 0.3)

ax.view_init(0,60)
plt.show()
```


WHEN $S_1=0.2$ AND $S_2=1$

```
ax.view_init(0,60)
plt.show()
```



WHEN $S_1=0.4$ AND $S_2=1$

Computer Graphics - Jupyter Notebook

localhost:8888/notebooks/Desktop/Computer%20Graphics.ipynb

ProgrammingWeb-DOnline judgesGFGMusic TubeProjects ideasCPSMSDaybyDayDSAPracticeRandomT2FOther bookmarksReading list

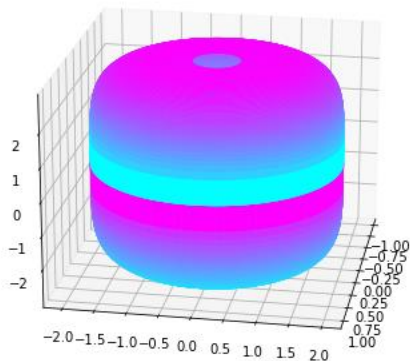
jupyter Computer Graphics Last Checkpoint: 4 hours ago (unsaved changes)

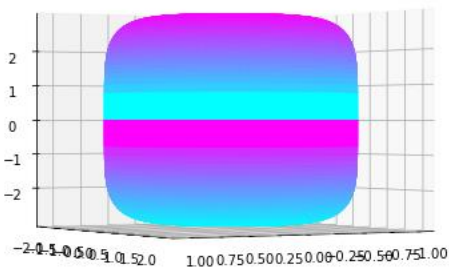
Python 3

FileEditViewInsertCellKernelWidgetsHelp

RunCode

```
ax.view_init(0,60)
plt.show()
```





12:2024-09-2021

ENG

WHEN $S_1=0.8$ AND $S_2=1$

Computer Graphics - Jupyter Notebook

localhost:8888/notebooks/Desktop/Computer%20Graphics.ipynb

Programming Web-D Online judges GFG Music Tube Projects ideas CP SM DaybyDay DSA Praticerandom ' T2FOther bookmarksReading list

jupyter Computer Graphics Last Checkpoint: 4 hours ago (unsaved changes)

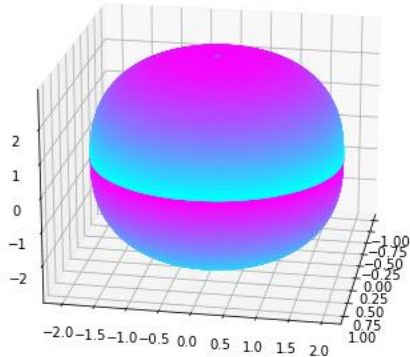
Python 3

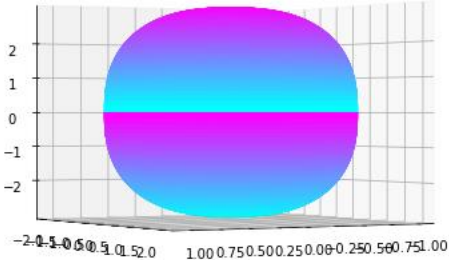
File Edit View Insert Cell Kernel Widgets Help

ax.plot_surface(x, y, z, alpha=0.1, rstride=1, cstride=1, cmap=cm.cool, linewidth=0.5, antialiased=True, zorder=0.5)

ax.view_init(0,60)

plt.show()





12:2124-09-2021

WHEN S1=1 AND S2=1

Computer Graphics - Jupyter No

+

localhost:8888/notebooks/Desktop/Computer%20Graphics.ipynb

🔍

☆

⚙️

👤

⋮

Programming

Web-D

Online judges

GFG

Music Tube

Projects ideas

CP

SM

DaybyDay

DSA

Pratice

random '

T2F

Other bookmarks

Reading list

jupyter

Computer Graphics

Last Checkpoint: 4 hours ago (unsaved changes)

🐍

Logout

File

Edit

View

Insert

Cell

Kernel

Widgets

Help

📄

+

🔍

📄

📄

⬆️

⬆️

▶️ Run

⬛

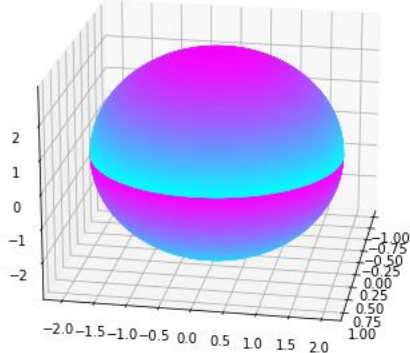
🔄

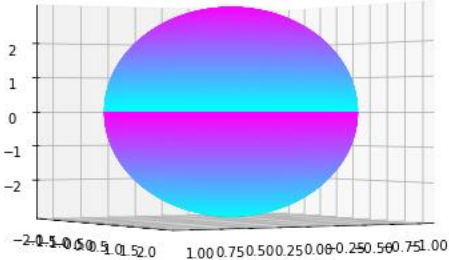
⏮️

Code

⌵

🗑️





In []:

In []:

🖥️

🔗

🌐

🔧

💬

🔍

📁

12:22

24-09-2021

ENG

1

WHEN $S_1=1.5$ AND $S_2=1$

Computer Graphics - Jupyter Notebook

localhost:8888/notebooks/Desktop/Computer%20Graphics.ipynb

ProgrammingWeb-DOnline judgesGFGMusic TubeProjects ideasCPSMSDaybyDayDSAPracticeRandomT2FOther bookmarksReading list

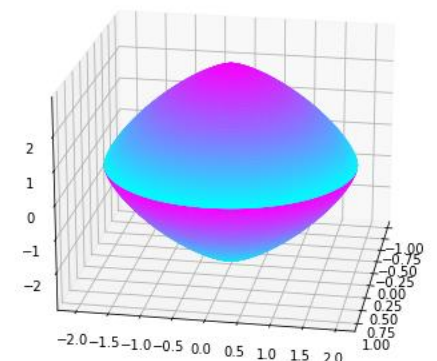
jupyter Computer Graphics Last Checkpoint: 4 hours ago (autosaved)

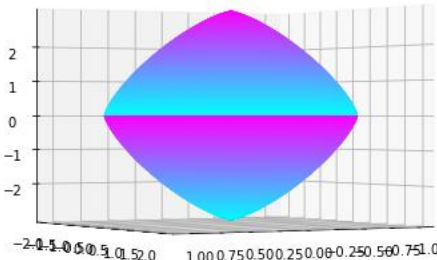
Python 3

FileEditViewInsertCellKernelWidgetsHelp

RunCode

```
plt.show()
```





In []:

12:2424-09-2021

THESE ARE ALL GRAPHS FOR ALL VALUES

**I AM ATTACHING CODE OF ELLIPSOID, TORUS AND SUPER-
ELLIPSOID IN CLASSROOM**