Data Visualization

Generate 3D surface plots with custom color maps and shading.

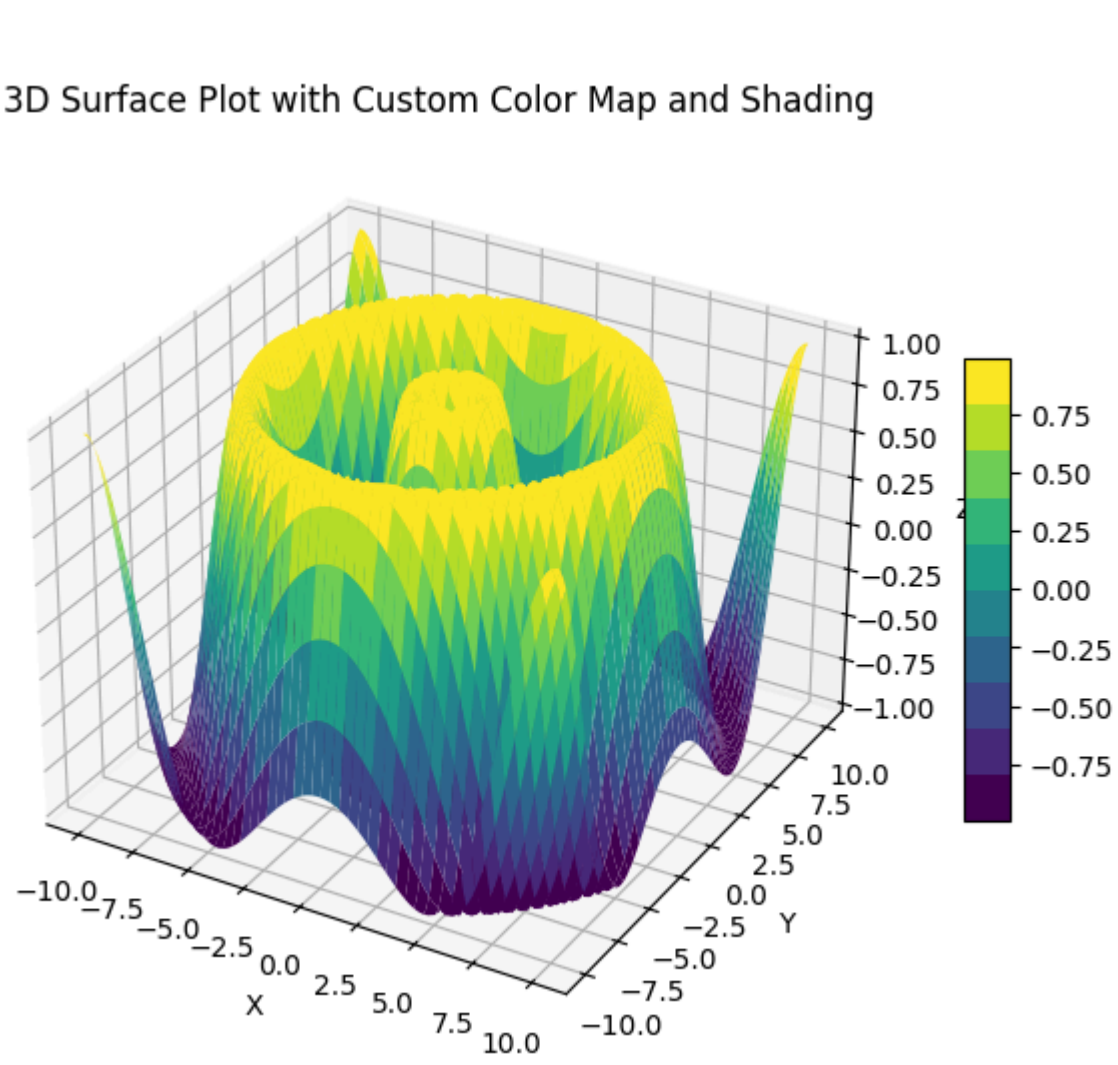
In [3]:
```
import numpy as np
import matplotlib.pyplot as plt
from mpl_toolkits.mplot3d import Axes3D

x = np.linspace(-10, 10, 100)
y = np.linspace(-10, 10, 100)
x, y = np.meshgrid(x, y)
z = np.sin(np.sqrt(x**2 + y**2))

cmap = plt.cm.get_cmap('viridis', 10)
cmap.set_under('white')
cmap.set_over('black')

fig = plt.figure(figsize=(8, 6))
ax = fig.add_subplot(111, projection='3d')
surf = ax.plot_surface(x, y, z, cmap=cmap, linewidth=0, antialiased=True)
ax.set_xlabel('X')
ax.set_ylabel('Y')
ax.set_zlabel('Z')
ax.set_title('3D Surface Plot with Custom Color Map and Shading')
fig.colorbar(surf, shrink=0.5, aspect=10)
plt.show()
```

```
C:\Users\VIKASH KUMAR SINGH\AppData\Local\Temp\ipykernel_15416\3483031409.py:10: Mat
plotlibDeprecationWarning: The get_cmap function was deprecated in Matplotlib 3.7 an
d will be removed in 3.11. Use ``matplotlib.colormaps[name]`` or ``matplotlib.colorm
aps.get_cmap()`` or ``pyplot.get_cmap()`` instead.
  cmap = plt.cm.get_cmap('viridis', 10)
```


3D Surface Plot with Custom Color Map and Shading
1.00
0.75
0.50
0.25
0.00
−0.25
−0.50
−0.75
−1.00
0.75
0.50
0.25
0.00
−0.25
−0.50
−0.75
−10.0
−7.5
−5.0
−2.5
0.0
2.5
5.0
7.5
10.0
X
10.0
7.5
5.0
2.5
0.0
−2.5
−5.0
−7.5
−10.0
Y

In [ ]: