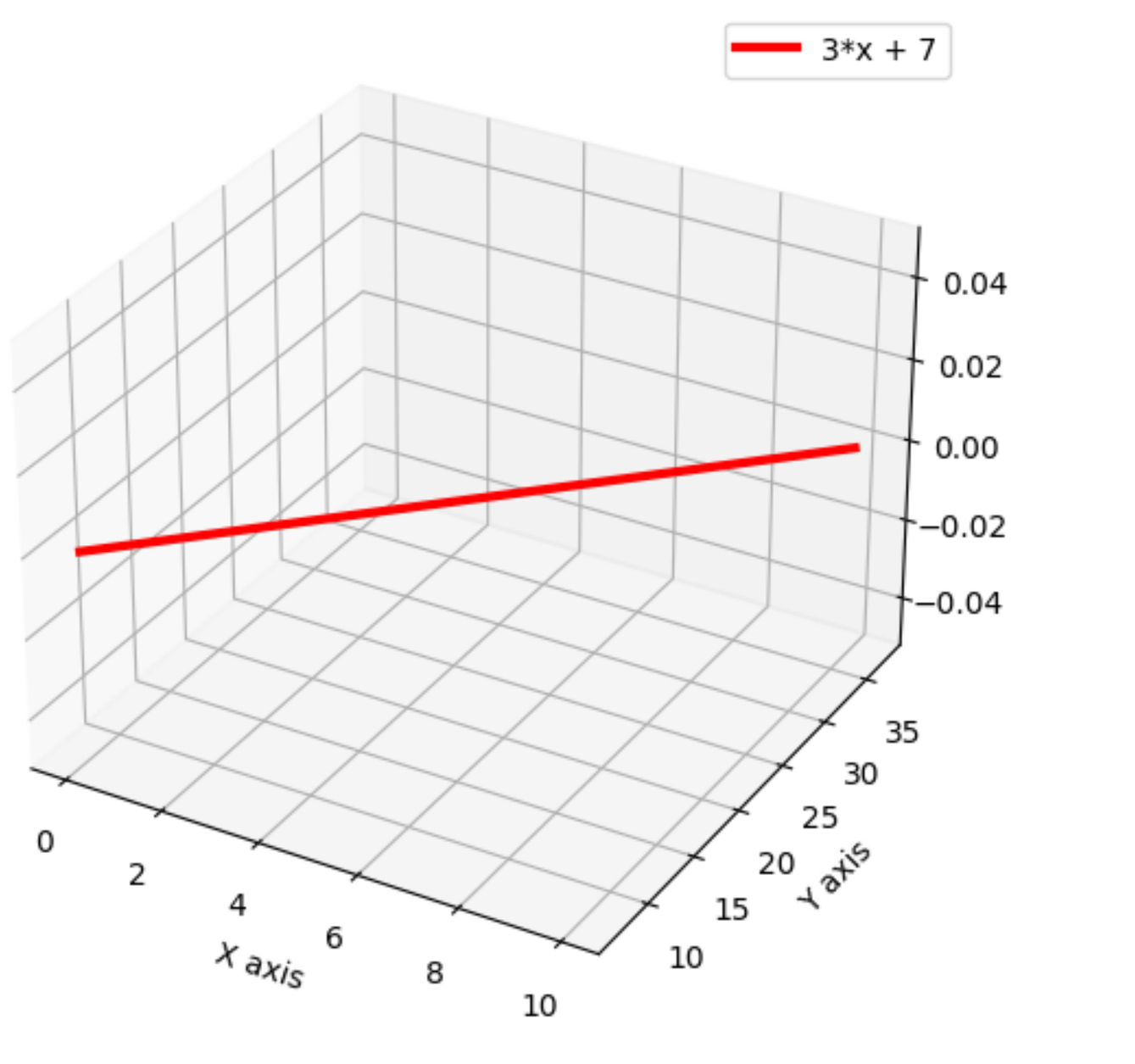
In [2]:

```python
from mpl_toolkits import mplot3d
import matplotlib.pyplot as plt
import numpy as np
import plotly.express as px
```

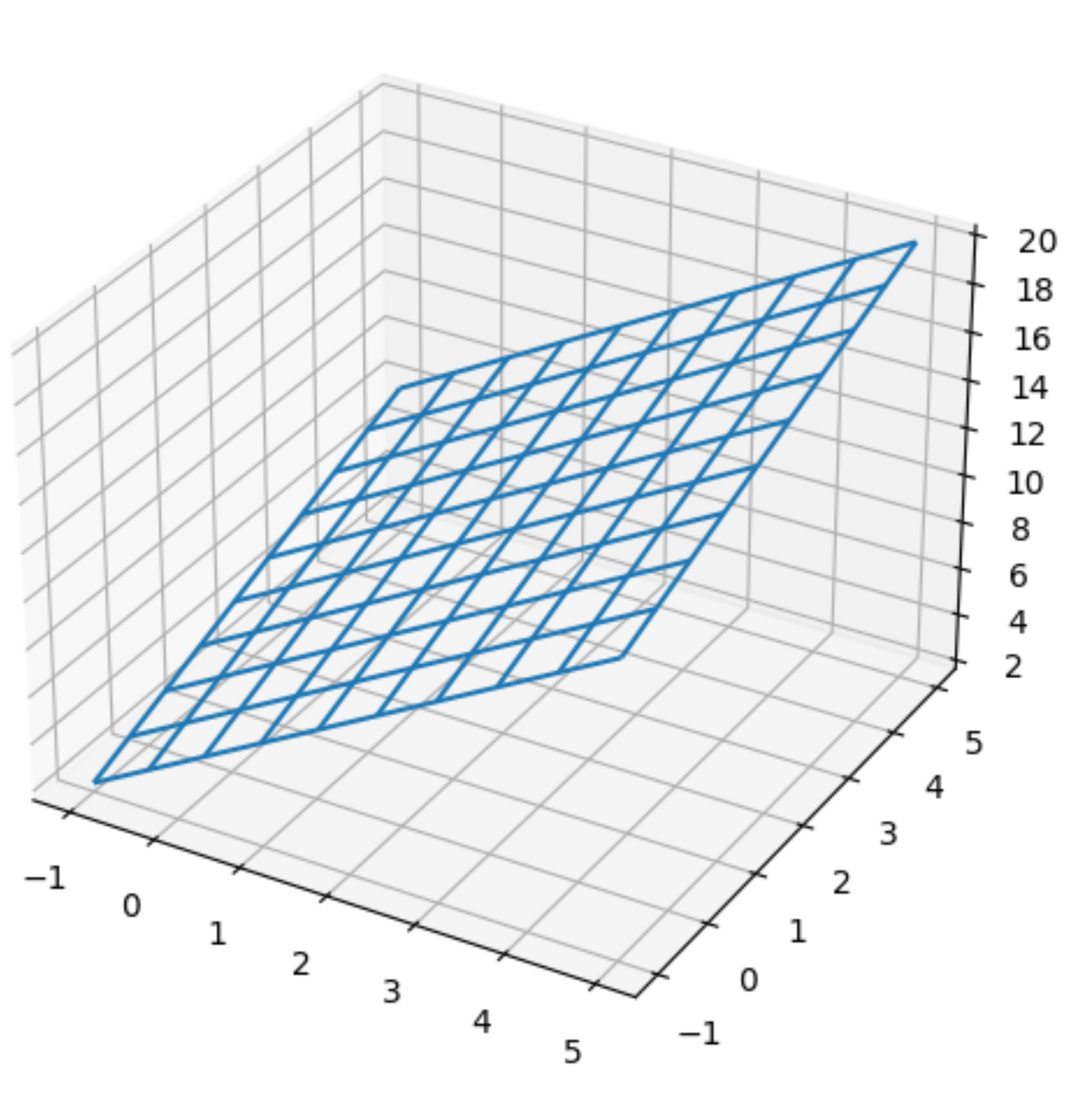
In [7]:

```python
# visualize a line in 3d space
# y = 3*x + 7

x_line = np.linspace(0, 10, 100)

y_line = 3 * x_line + 7

z_line = np.zeros_like(x_line)

# set up the figure and 3d axis
fig = plt.figure(figsize=(8, 6))
ax = fig.add_subplot(111, projection='3d')

# plot the line
ax.plot(x_line, y_line, z_line, color='red', label='3*x + 7', linewidth=3)
ax.set_xlabel('X axis')
ax.set_ylabel('Y axis')
ax.legend()
plt.show()
```



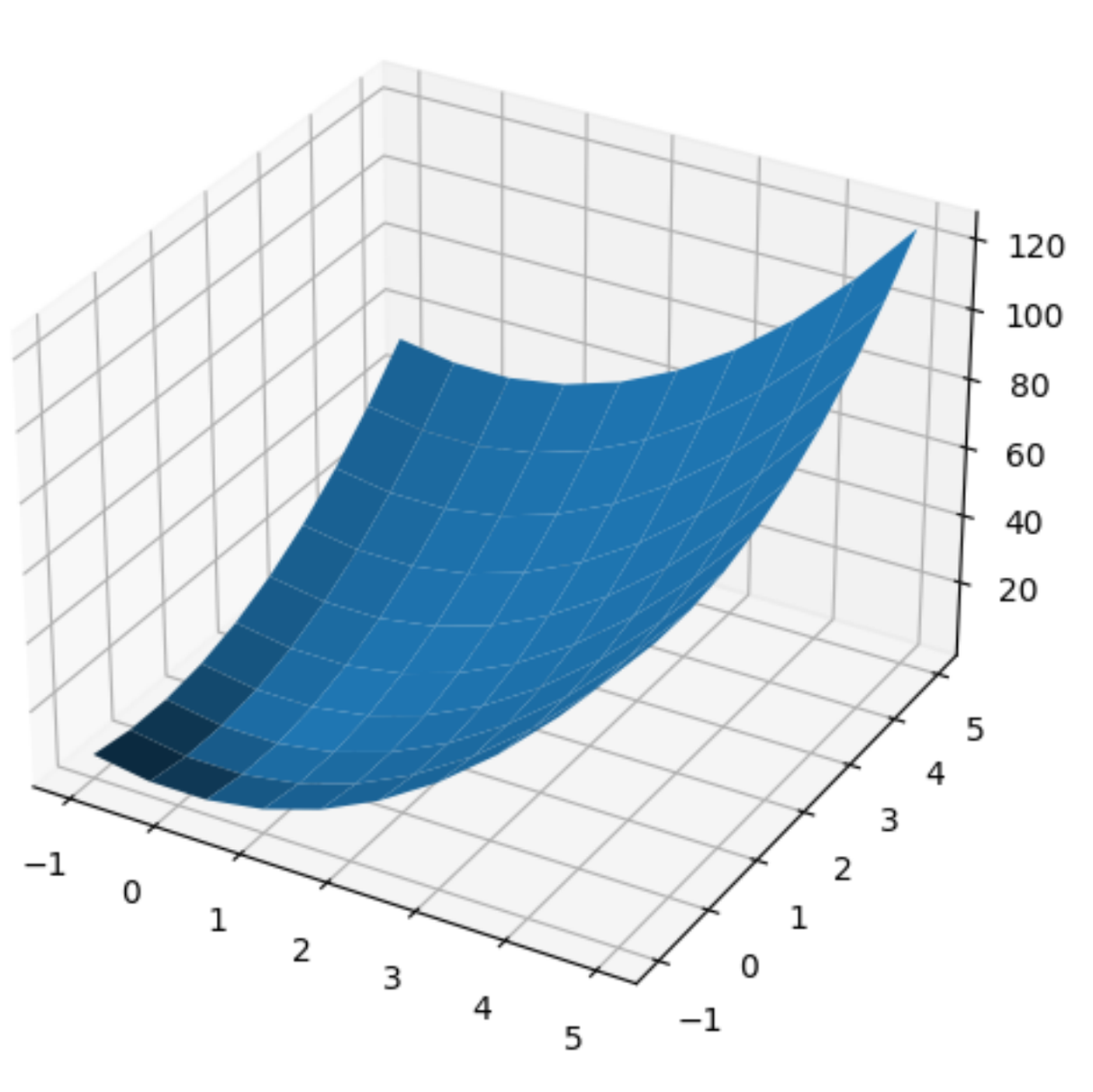
In [9]:

```python
# z = f(x, y) = 2*x + y + 5
def f(x, y):
  return 2*x + y + 5

# x and y axis
x = np.linspace(-1, 5, 10)
y = np.linspace(-1, 5, 10)

a, d = np.meshgrid(x, y)
Z = f(a, d)

fig = plt.figure(figsize=(8, 6))
ax = fig.add_subplot(111, projection='3d')
ax.plot_wireframe(a, d, Z)
plt.show()
```



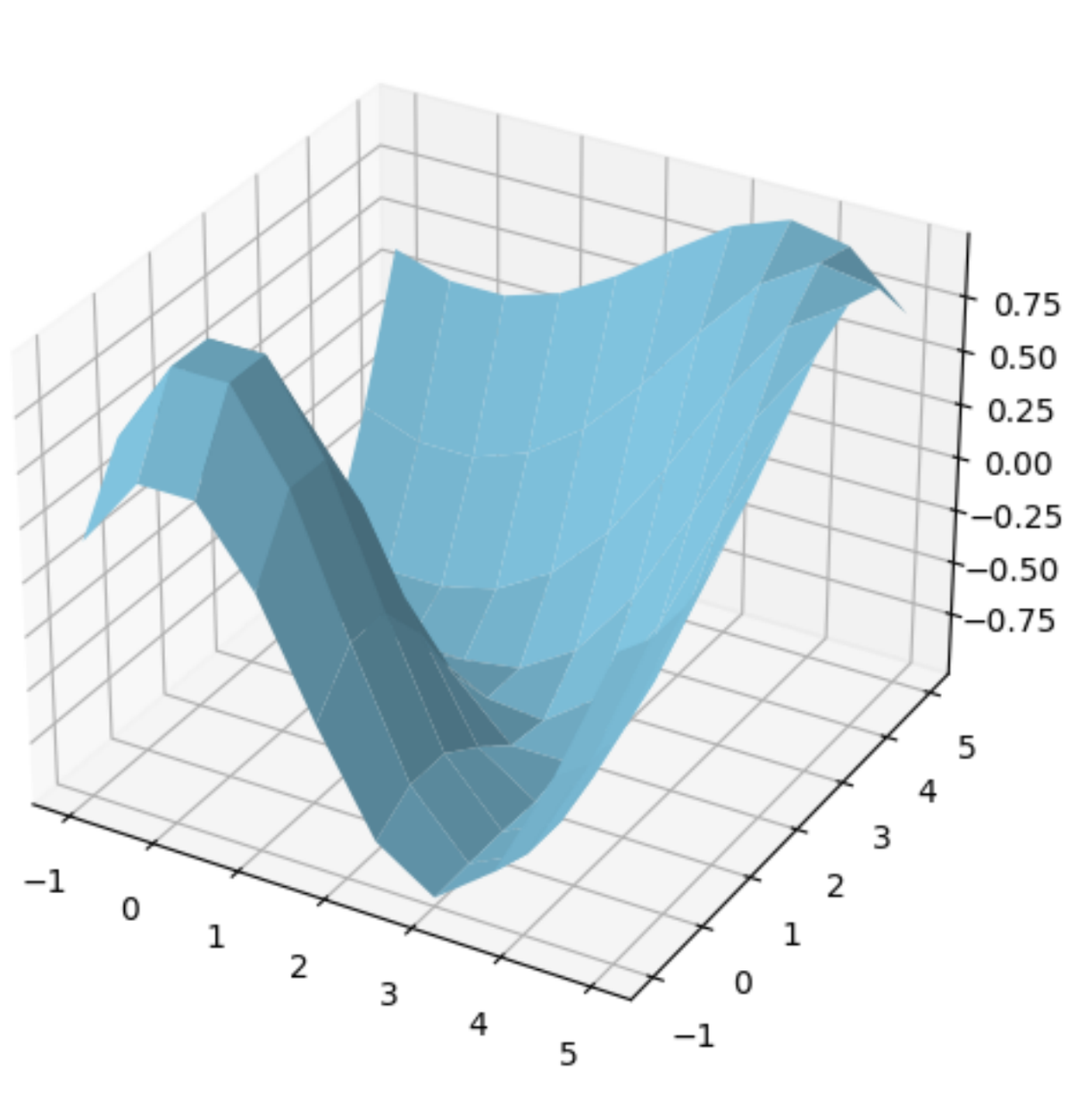
In [12]:

```python
# z = f(x, y) = 3*x*x + 2*y*y
def f(x, y):
  return 3*x*x + 2*y*y

x = np.linspace(-1, 5, 10)
y = np.linspace(-1, 5, 10)

X, Y = np.meshgrid(x, y)
Z = f(X, Y)

fig = plt.figure(figsize=(8, 6))
ax = fig.add_subplot(111, projection='3d')

ax.plot_surface(X, Y, Z)
plt.show()
```



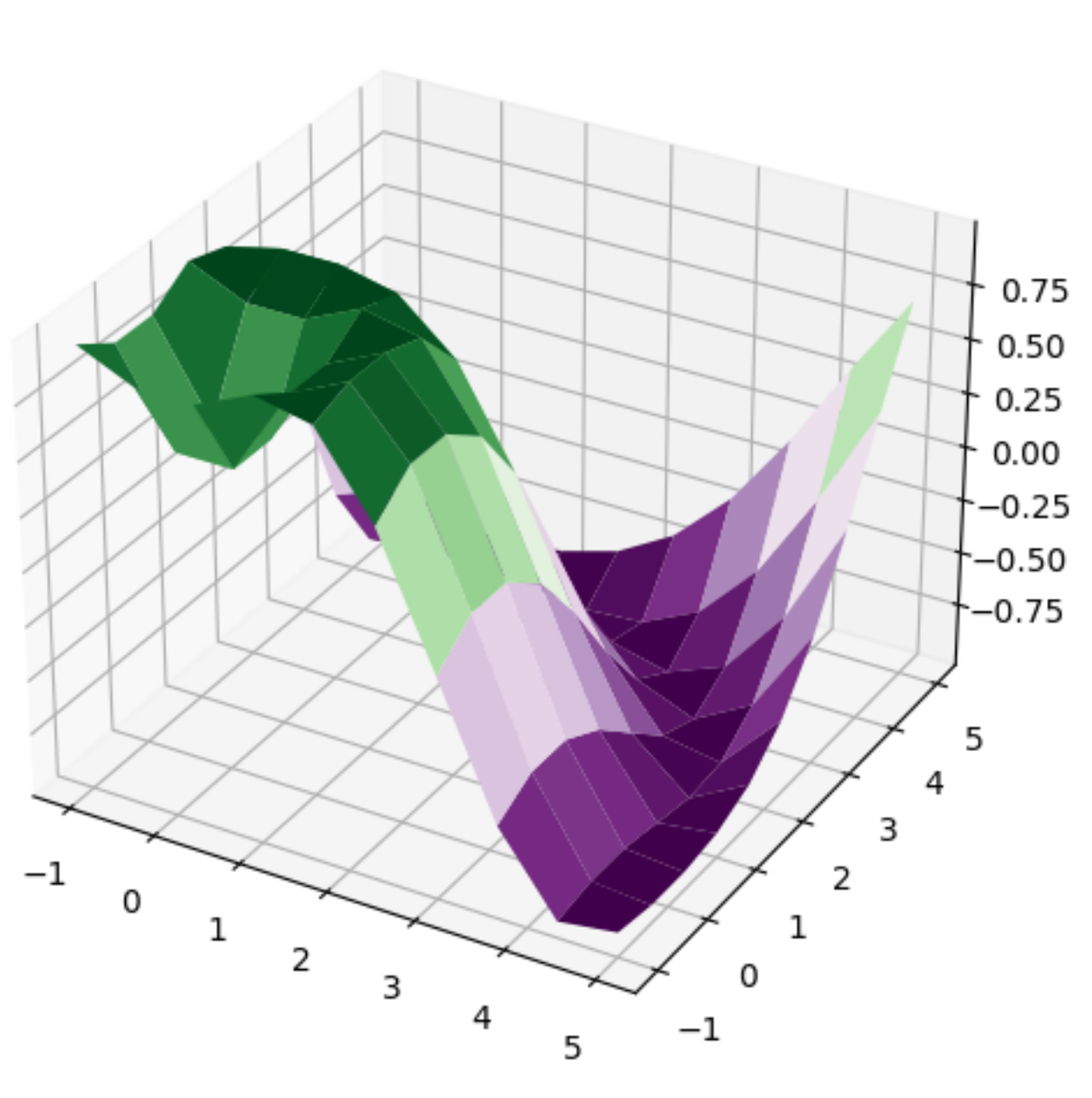
In [16]:

```python
def f(x, y):
  return np.cos(np.sqrt(x**2 + y**2))

x = np.linspace(-1, 5, 10)
y = np.linspace(-1, 5, 10)

X, Y = np.meshgrid(x, y)
Z = f(X, Y)

fig = plt.figure(figsize=(8, 6))
ax = fig.add_subplot(111, projection='3d')
ax.plot_surface(X, Y, Z, color='skyblue')
plt.show()
```



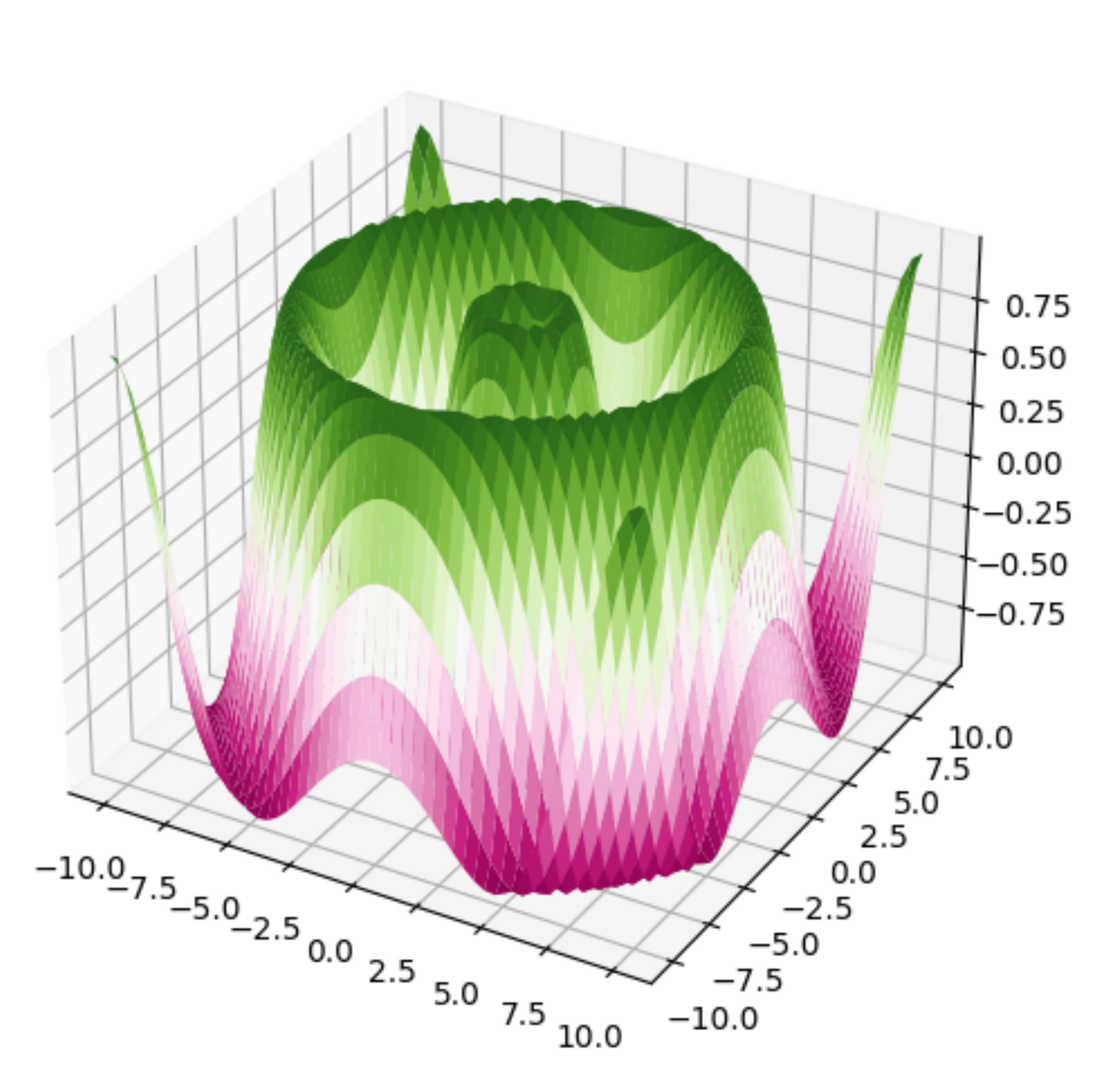
In [19]:

```python
def f(x, y):
  return np.sin(np.sqrt(x**2 + y**2))

x = np.linspace(-1, 5, 10)
y = np.linspace(-1, 5, 10)

X, Y = np.meshgrid(x, y)
Z = f(X, Y)

fig = plt.figure(figsize=(8, 6))
ax = fig.add_subplot(111, projection='3d')
ax.plot_surface(X, Y, Z, cmap='PRGn')
plt.show()
```



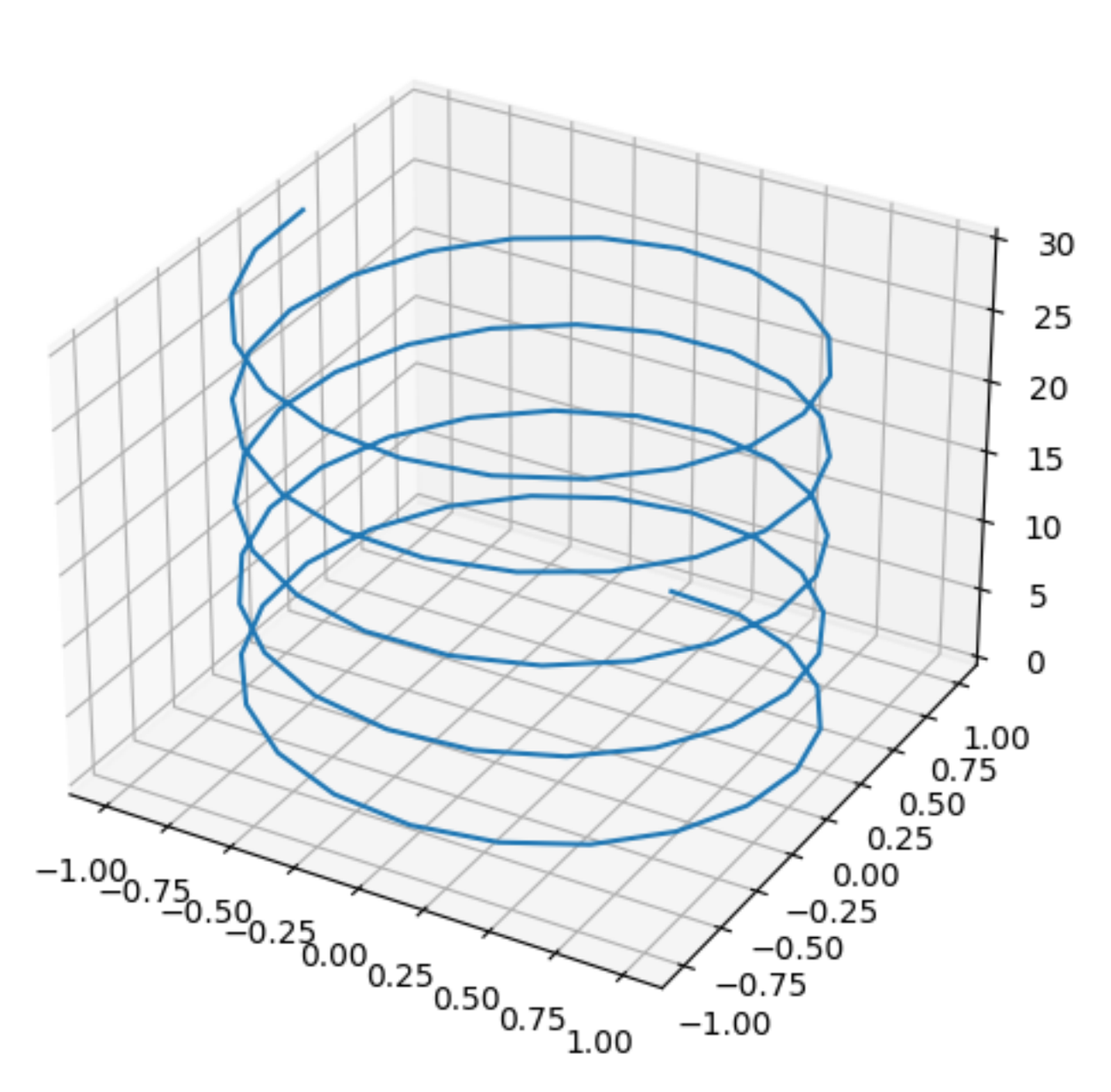
In [22]:

```python
def f(x, y):
  return np.sin(np.sqrt(x**2 + y**2))

x = np.linspace(-10, 10, 50)
y = np.linspace(-10, 10, 50)

X, Y = np.meshgrid(x, y)
Z = f(X, Y)

fig = plt.figure(figsize=(8, 6))
ax = fig.add_subplot(111, projection='3d')
ax.plot_surface(X, Y, Z, cmap='PiYG')
plt.show()
```



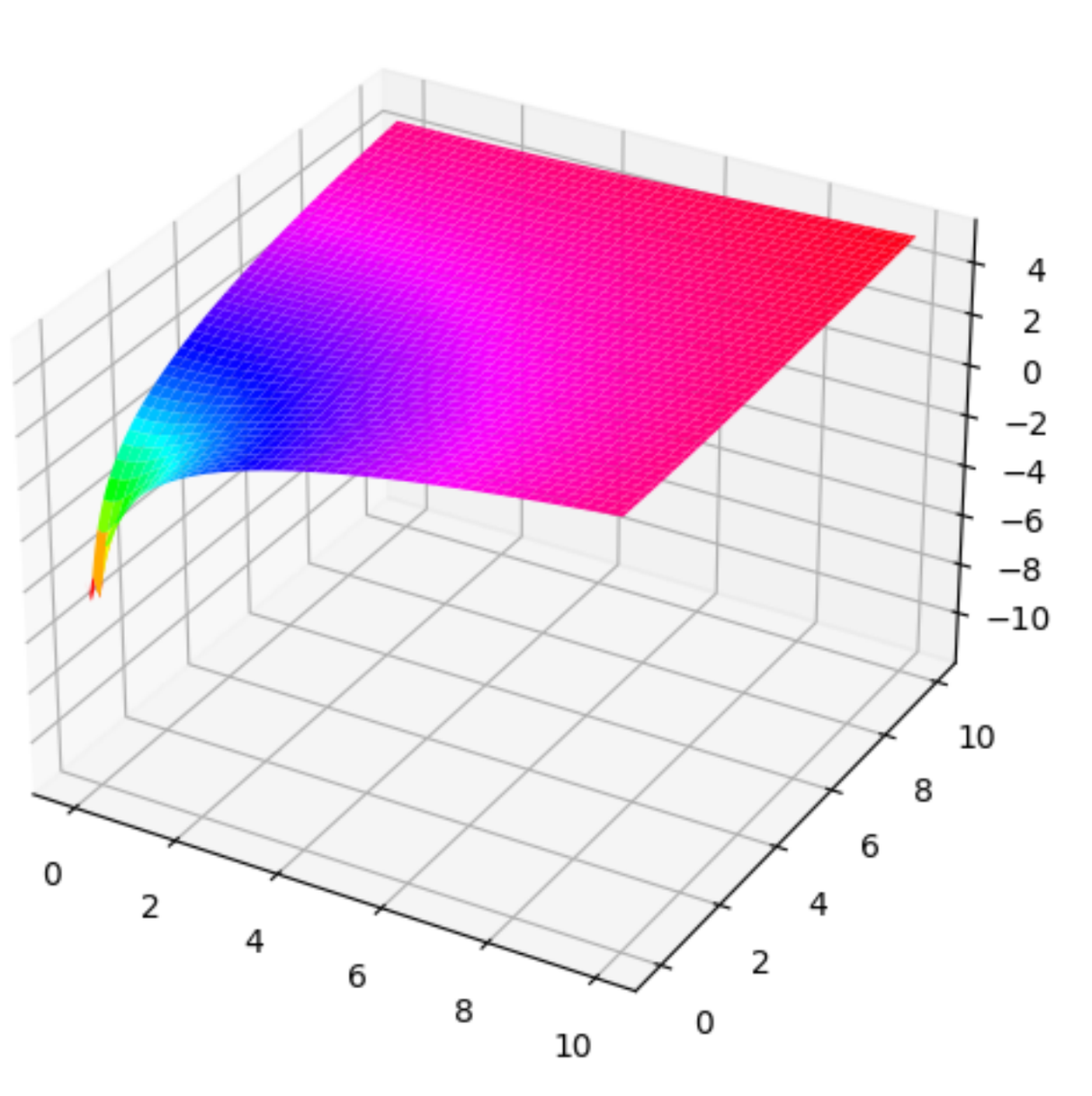
In [25]:

```python
# generate data
t = np.linspace(0, 30, 100)

x = np.sin(t)
y = np.cos(t)
z = t

fig = plt.figure(figsize=(8, 6))
ax = fig.add_subplot(111, projection='3d')

ax.plot(x, y, z, label='3D spiral line')
plt.show()
```



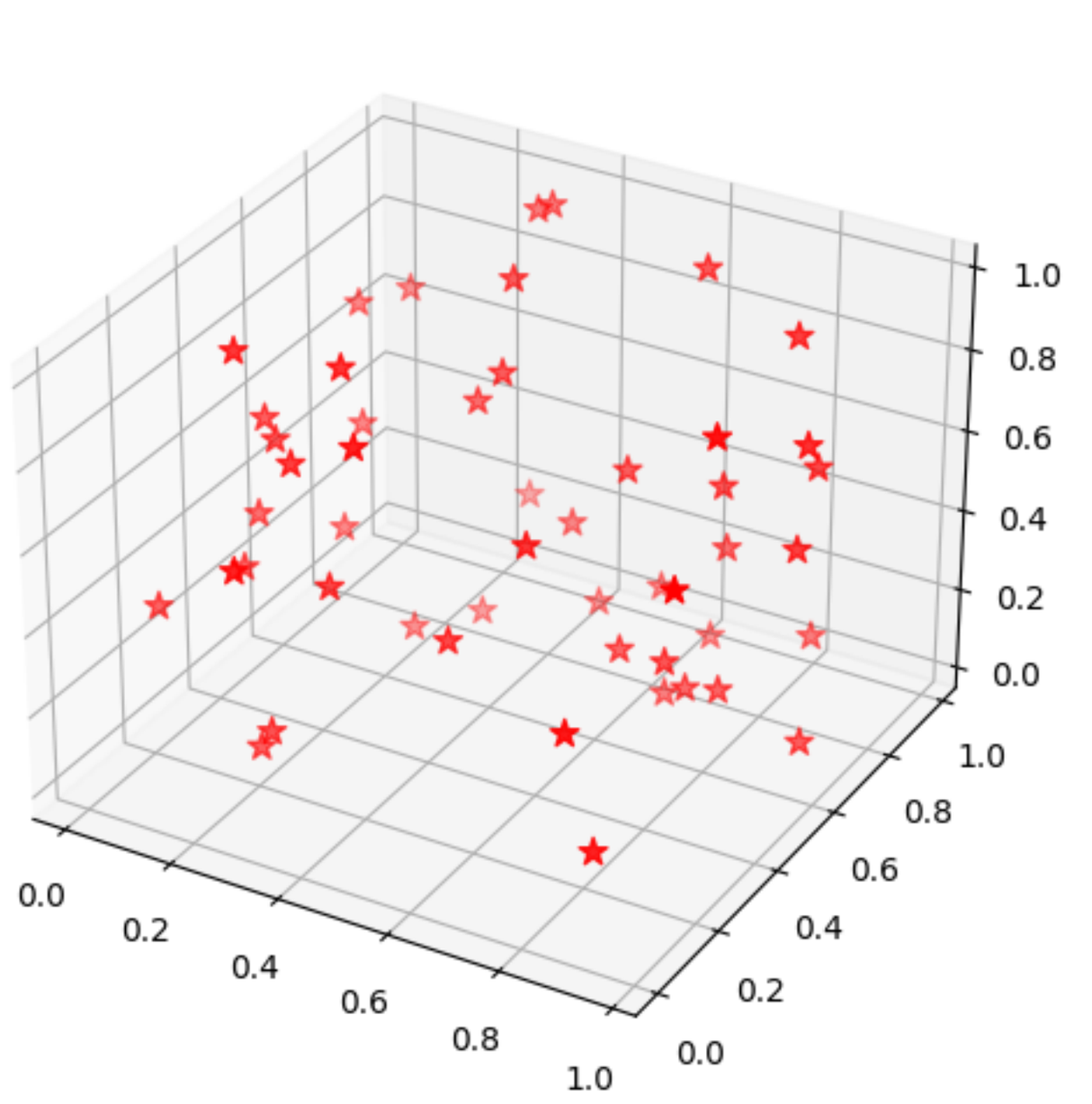
In [26]:

```python
def f(x, y):
  return np.log(x**2 + y**2)

x = np.linspace(-0.1, 10, 100)
y = np.linspace(-0.1, 10, 100)
X, Y = np.meshgrid(x, y)
Z = f(X, Y)
fig = plt.figure(figsize=(8, 6))
ax = fig.add_subplot(111, projection='3d')
ax.plot_surface(X, Y, Z, cmap='hsv')
plt.show()
```



In [42]:

```python
# generate some data
x = np.random.rand(50)
y = np.random.rand(50)
z = np.random.rand(50)

fig = plt.figure(figsize=(8, 6))
ax = fig.add_subplot(111, projection='3d')

ax.scatter(x, y, z, c='r', marker='*', s=80)
plt.show()
```

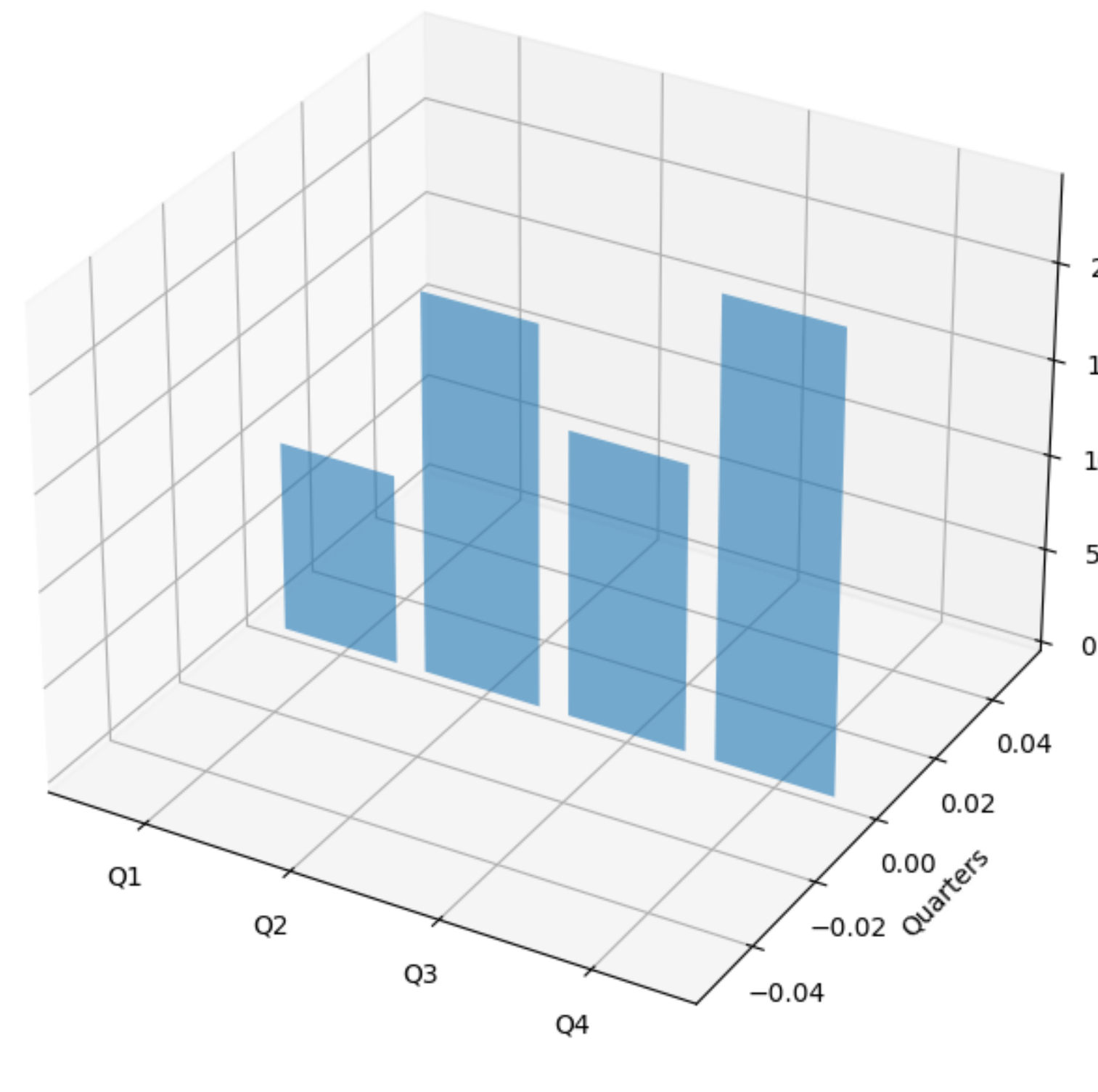


In [43]:

```python
x = np.random.rand(50)
y = np.random.rand(50)
z = np.random.rand(50)

fig = px.scatter_3d(x=x, y=y, z=z)
fig.show()
```

In [55]:

```python
# visualize barchart in 3d space
# data
sales = [10, 20, 15, 24]
quarters = ['Q1', 'Q2', 'Q3', 'Q4']

fig = plt.figure(figsize=(8, 8))
ax = fig.add_subplot(111, projection='3d')

# create an array with the position of each bar along the x-axis
x_pos = np.arange(4)

# plot
ax.bar(x_pos, sales, zdir='y', alpha=0.6)
ax.set_xticks(x_pos)
ax.set_xticklabels(quarters)
ax.set_ylabel('Quarters')
ax.set_zlabel('Sales')
plt.show()
```



In [ ]: