

# 3D Plotting and Debugging

# This session...

- Practice of the following
  - Debugging
  - 3D plotting with Matplotlib

- **Class Rule: Please sit in the same seat every class!**



# Debugging: Errors and Exceptions

## Syntax

try

Run this code

except

Run this code if an  
exception occurs

else

Run this code if no  
exception occurs

## Example

```
try:  
    x=int(input("Enter the value of x:"))  
    y=int(input("Enter the value of y:"))  
    z=x/y  
    print(z)  
except:  
    print("Zero division error")  
else:  
    print("If no error occurs, else block will execute")
```

# Debugging: Printing Exception Messages

## Syntax

```
try:
    #Some code
except Exception as e:
    print("Error: ",str(e))
```

## Example 2

```
import math
try:
    i=1
    k=1.0
    while i!=0:
        k=math.exp(i)
        i=i+0.1
except Exception as e:
    print("Error1: ",str(e))
    print("k=",k)
    print("i=",i)
```

## Example 1

```
try:
    x=int(input("Enter the value of x:"))
    y=int(input("Enter the value of y:"))
    z=x/y
    print(z)
except Exception as e:
    print("Error: ",str(e))
```

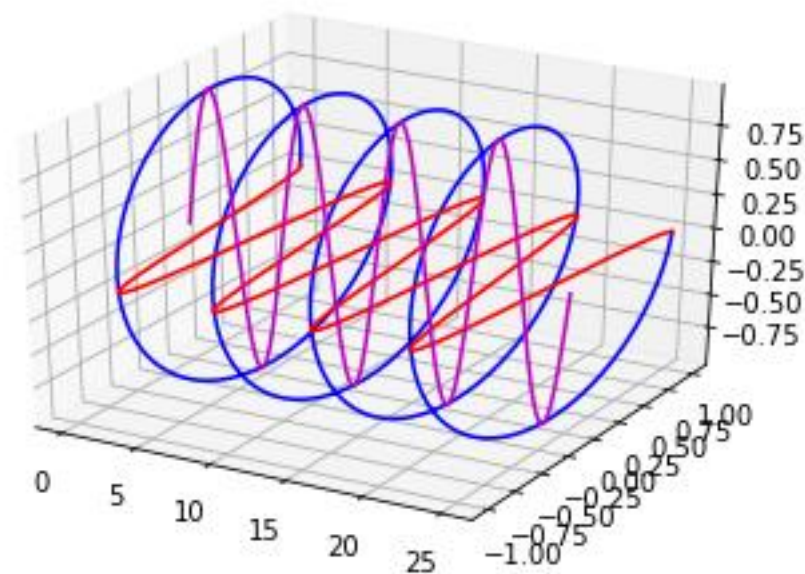
```
Enter the value of x:1
Enter the value of y:0
Error:  division by zero
```

## 3D Plotting: Line plots

```
import numpy as np
import matplotlib.pyplot as plt
from mpl_toolkits.mplot3d import Axes3D
fig = plt.figure()
ax = fig.add_subplot(111, projection='3d')
```

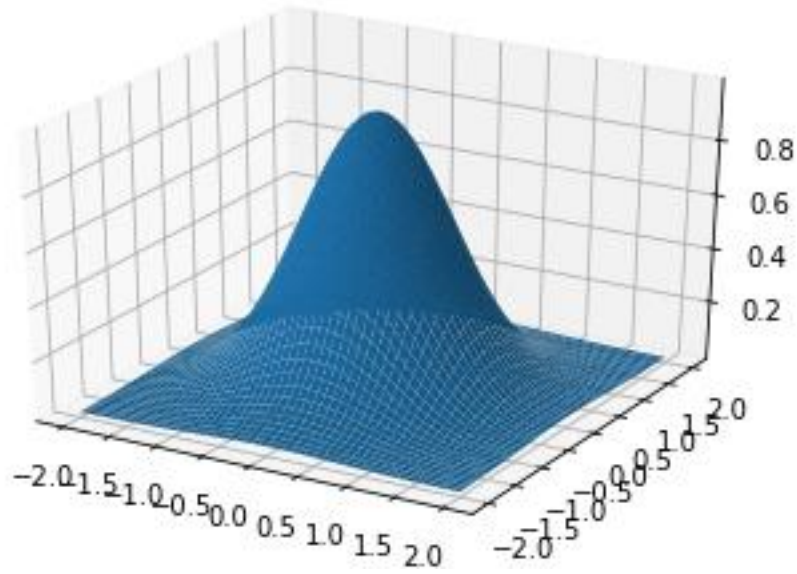
```
ax.plot(x, y, z, 'b')
ax.plot(x, y,  $\theta$ , color='r')
ax.plot(x, [ $\theta$ ]*n, z, color='m')
```

```
n = 1000
theta_max = 8 * np.pi
theta = np.linspace(0, theta_max, n)
x = theta
z = np.sin(theta)
y = np.cos(theta)
```



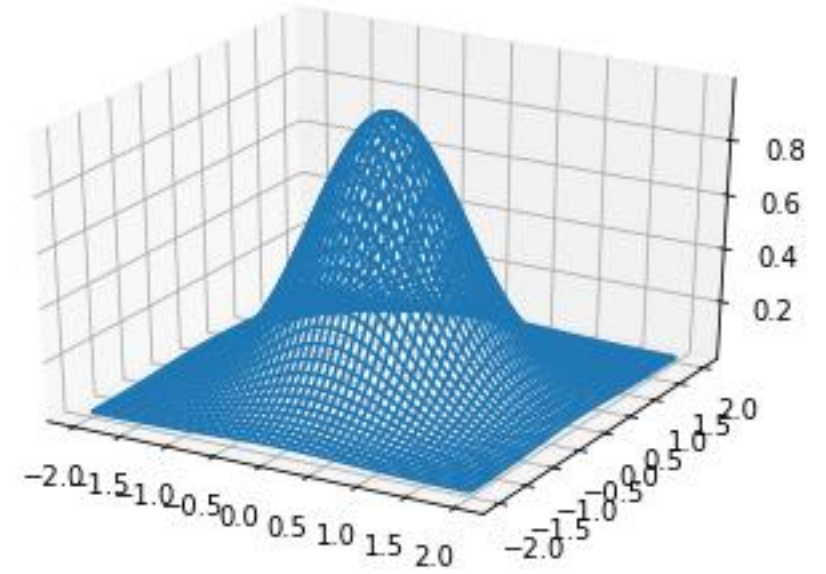
## 3D Plotting: Wireframe and Surface

```
import numpy as np
import matplotlib.pyplot as plt
from mpl_toolkits.mplot3d import Axes3D
fig = plt.figure()
ax = fig.add_subplot(111, projection='3d')
```



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

```
L, n = 2, 400
x = np.linspace(-L, L, n)
y = x.copy()
z = x.copy()
X, Y = np.meshgrid(x, y)
A = np.double(0.1)
Z = np.exp(-(X**2+Y**2))
```



```
ax.plot_wireframe(X, Y, Z)
```