```
# PracticaL no. 2: To Plot the graph for 3D
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# Roll no.: 10
```

In [1]:

```
#Q1)PLot the Graph of f(x)=s in(x^2+y^2) in -6<x,y<6
```
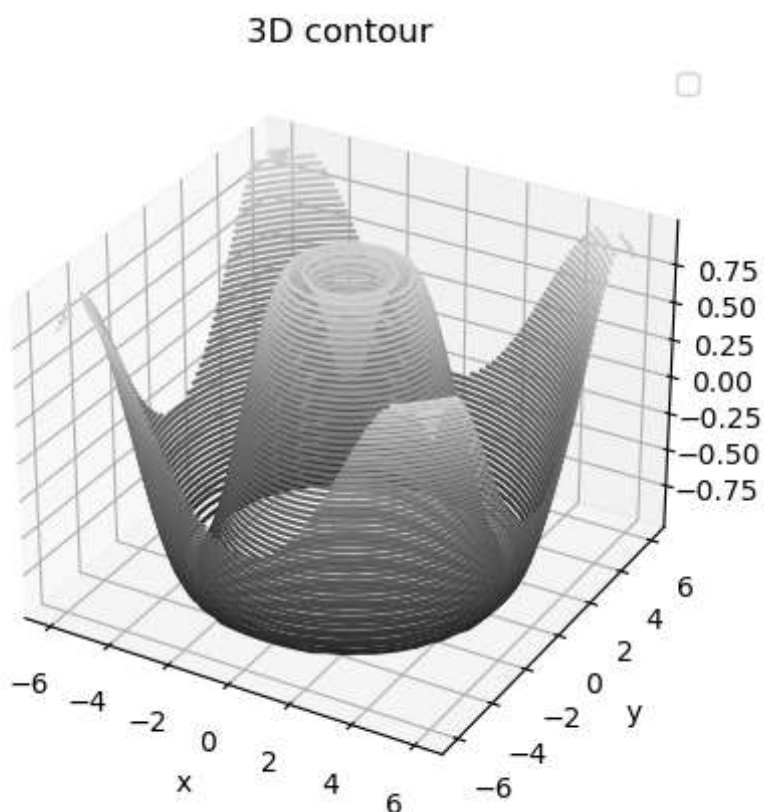
In [3]:

```
from mpl_toolkits import mplot3d
import numpy as np

from pylab import*

def f(x,y):
    return np.sin(np.sqrt(x**2+y**2))
x=np.linspace(-6,6,30)
y=np.linspace(-6,6,30)
X,Y=np.meshgrid(x,y)
Z=f(X,Y)
ax=axes(projection='3d')
ax.contour3D(X,Y,Z,50)
xlabel('x')
ylabel('y')
title('3D contour')
legend()
show()
```

No artists with labels found to put in legend. Note that artists whose la
bel start with an underscore are ignored when legend() is called with no a
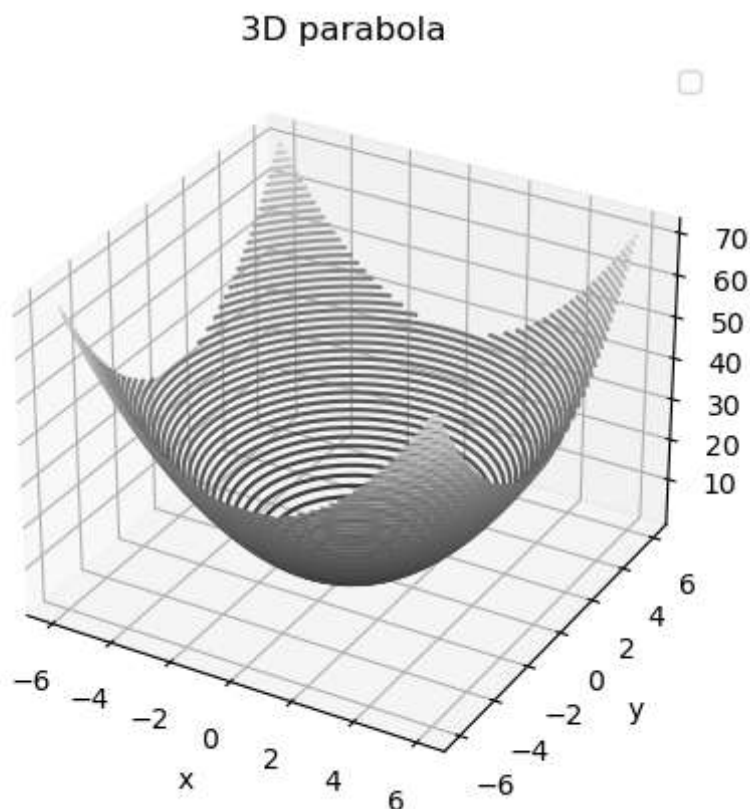rgument.

In [5]:

```
#Q2)Plot the parabola z=x^2+y2 in  -6<x, y<6
```

In [6]:

```
from mpl_toolkits import mplot3d
import numpy as np
from pylab import*
def f(x,y):
    return x**2+y**2
x=np.linspace(-6,6,30)
y=np.linspace(-6,6,30)
X,Y=np.meshgrid(x,y)
Z=f(X,Y)
ax=axes(projection='3d')
ax.contour3D(X,Y,Z,50)
xlabel('x')
ylabel('y')
title('3D parabola')
legend()
show()
```

No artists with labels found to put in legend. Note that artists whose label start with an underscore are ignored when legend() is called with no argument.

In [7]:

```
#Q3) Plot the graph of  f(x)= e^(-x^2-y^2)  in  -1<x,y<1
```
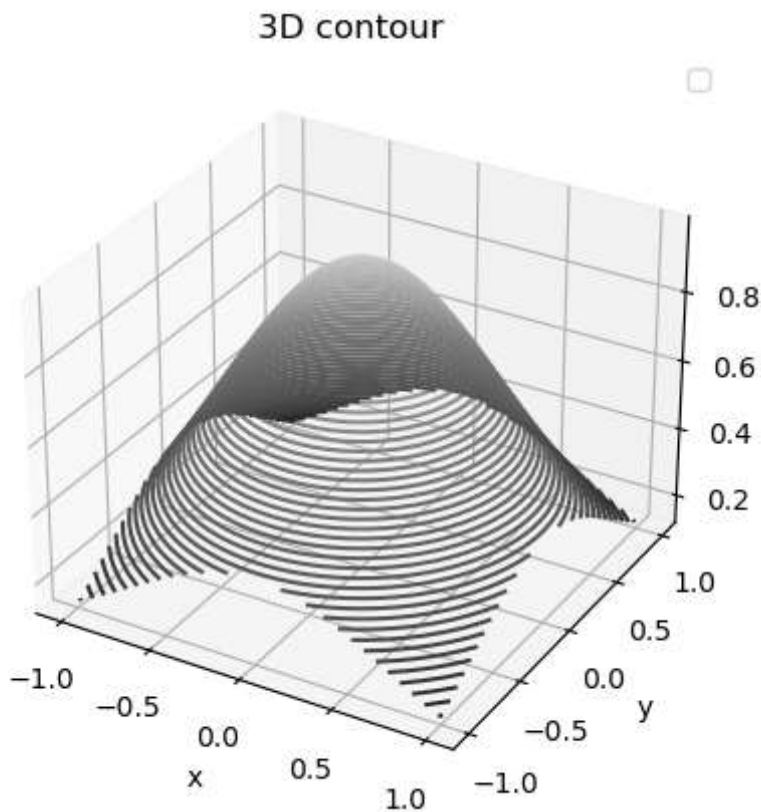
In [9]:

```python
from mpl_toolkits import mplot3d
import numpy as np

from pylab import*

def f(x,y):
    return np.exp(-x**2-y**2)
x=np.linspace(-1,1,30)
y=np.linspace(-1,1,30)
X,Y=np.meshgrid(x,y)
Z=f(X,Y)
ax=axes(projection='3d')
ax.contour3D(X,Y,Z,50)
xlabel('x')
ylabel('y')
title('3D contour')
legend()
show()
```

No artists with labels found to put in legend. Note that artists whose la
bel start with an underscore are ignored when legend() is called with no a
rgument.

3D contour

In [10]:

```python
# Q.4) Plot the graph of f(x)=(sin(4x)-cos(5y))/5 in -1<x,y<1
```

In [11]:

```python
from mpl_toolkits import mplot3d
import numpy as np
from pylab import*
def f(x,y):
    return (np.sin(4*x)-np.cos(5*y))/5
x=np.linspace(-1,1,30)
y=np.linspace(-1,1,30)
X,Y=np.meshgrid(x,y)
Z=f(X,Y)
ax=axes(projection='3d')
ax.contour3D(X,Y,Z,50)
xlabel('x')
ylabel('y')
title('3D contour')
legend()
show()
```

No artists with labels found to put in legend. Note that artists whose la
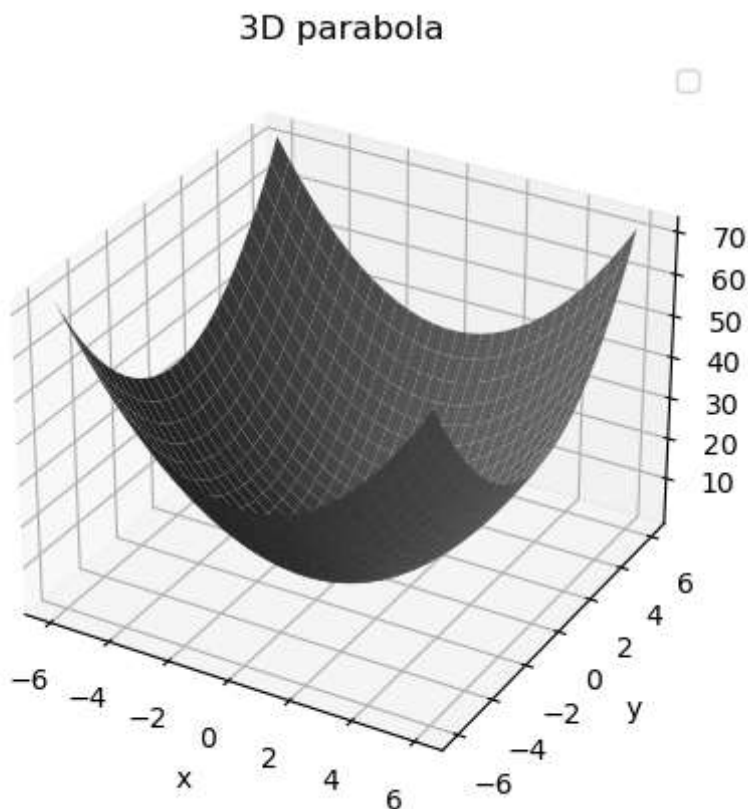bel start with an underscore are ignored when legend() is called with no a
rgument.
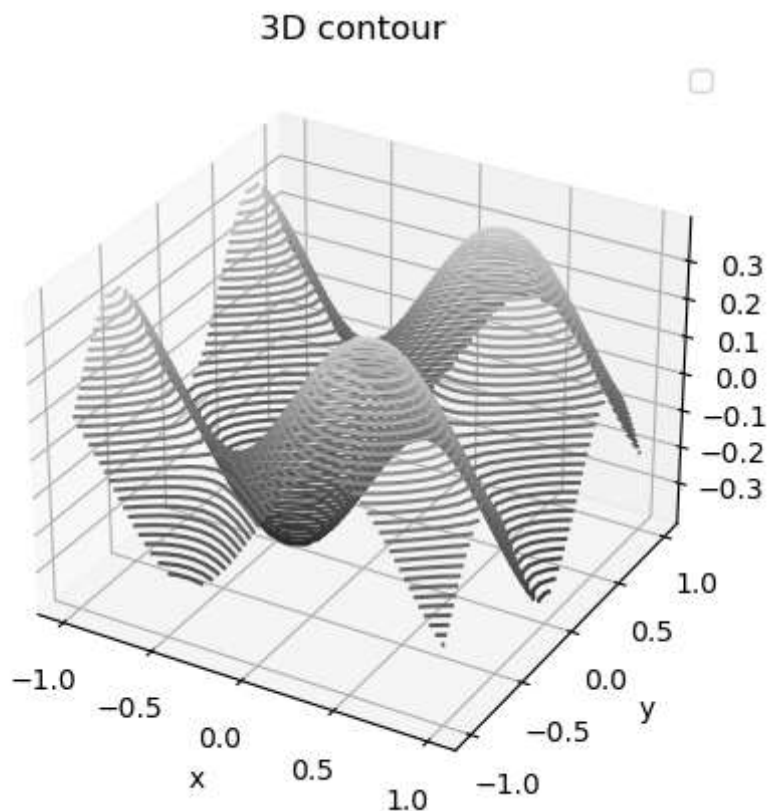
In [12]:

```python
#Q5)Plot the parabola z=x^2+y^2 in -6<x, y<6
```

In [13]:

```
from mpl_toolkits import mplot3d
import numpy as np
from pylab import*
def f(x,y):
    return x**2+y**2
x=np.linspace(-6,6,30)
y=np.linspace(-6,6,30)
X,Y=np.meshgrid(x,y)
Z=f(X,Y)
ax=axes(projection='3d')
ax.plot_surface(X,Y,Z)
xlabel('x')
ylabel('y')
title('3D parabola')
legend()
show()
```

No artists with labels found to put in legend. Note that artists whose label start with an underscore are ignored when legend() is called with no argument.

3D parabola

In [14]:

```
#Q6) Plot the function z=xe^(- x^2 -y^2) in  -6<x,y<6
```

In [15]:

```python
from mpl_toolkits import mplot3d
import numpy as np

from pylab import*

def f(X,Y):
    return X*np.exp(-X**2-Y**2)
x=np.linspace(-6,6,30)
y=np.linspace(-6,6,30)
X,Y=np.meshgrid(x,y)
Z=f(X,Y)
ax=axes(projection='3d')
ax.plot_surface(X,Y,Z)
xlabel('x')
ylabel('y')
title('$z=xe'{-x'2-y'2}$')
legend()
show()
```
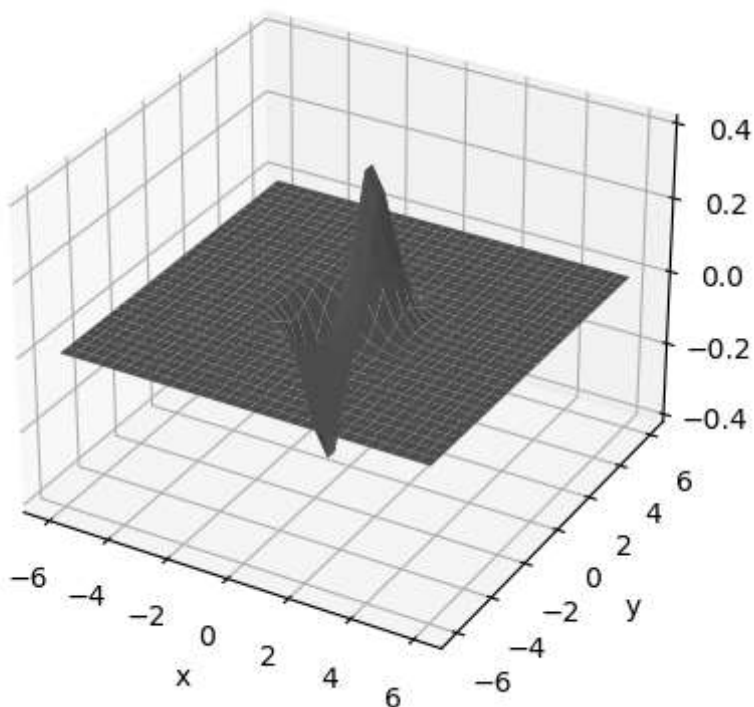
No artists with labels found to put in legend. Note that artists whose label start with an underscore are ignored when legend() is called with no argument.

$$z = xe' - x'2 - y'2$$

In [16]:

```python
#Q7)Plot the function z=cos(|x|+|y|) in -1<x,y<1
```
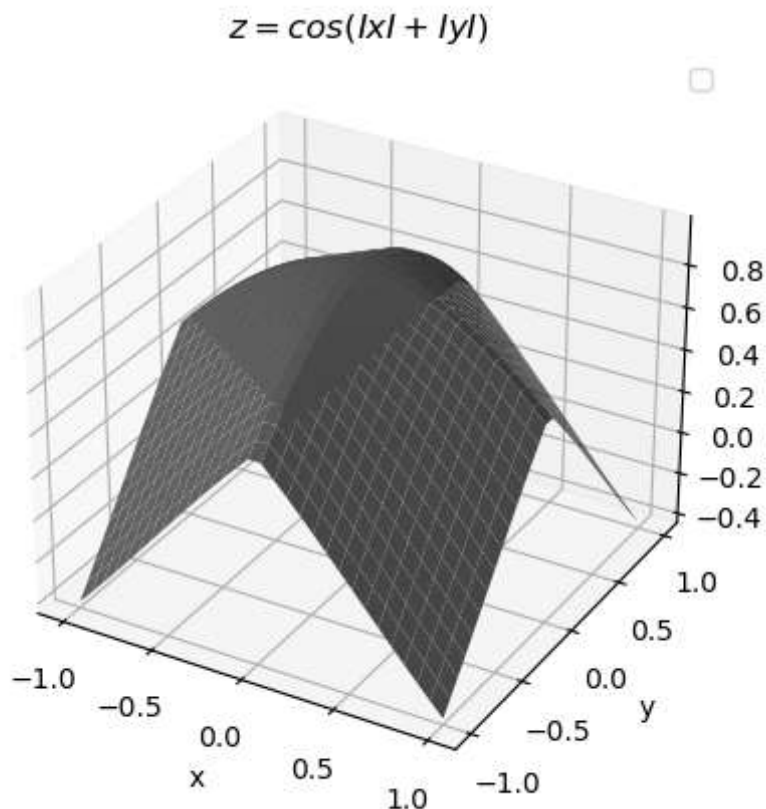
```
from mpl_toolkits import mplot3d
import numpy as np

from pylab import*
from math import*

def f(X,Y):
    return np.cos(abs(X)+abs(Y))
x=np.linspace(-1,1,30)
y=np.linspace(-1,1,30)
X,Y=np.meshgrid(x,y)
Z=f(X,Y)
ax=axes(projection='3d')
ax.plot_surface(X,Y,Z)
xlabel('x')
ylabel('y')
title(' $z=cos( I x I + I y I )$')
legend()
show()
```

No artists with labels found to put in legend. Note that artists whose la
bel start with an underscore are ignored when legend() is called with no a
rgument.

$z = \cos(|x| + |y|)$

In [19]:

```
#Q8)Plot the function z=cos(x^2+y^2-0.5)-0.5  in -1<x,y<1
```
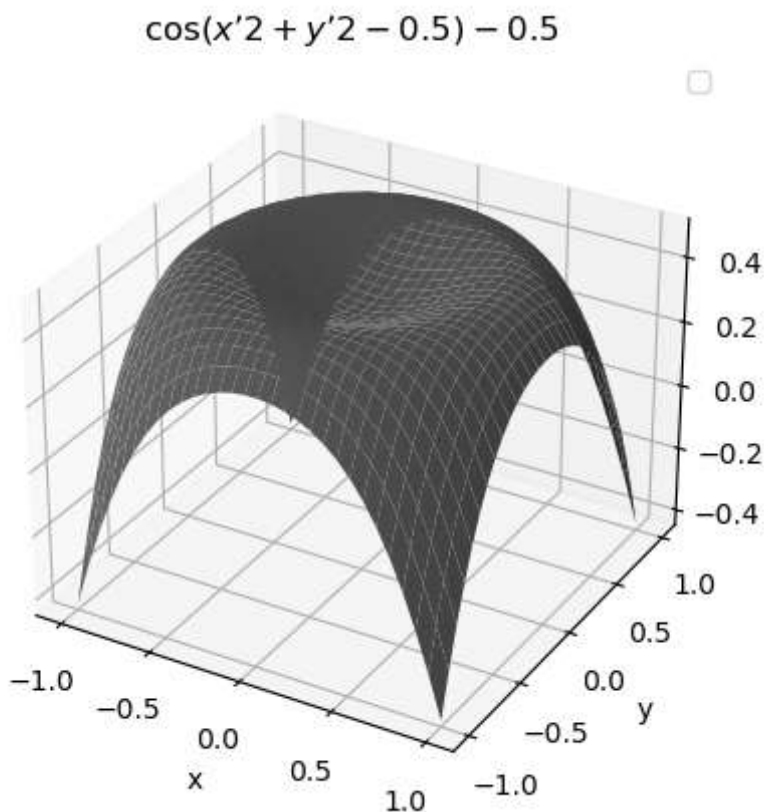
In [20]:

```python
from mpl_toolkits import mplot3d
import numpy as np

from pylab import*

def f(X,Y):
    return np.cos(X**2+Y**2-0.5)-0.5
x=np.linspace(-1,1,30)
y=np.linspace(-1,1,30)
X,Y=np.meshgrid(x,y)
Z=f(X,Y)
ax=axes(projection='3d')
ax.plot_surface(X,Y,Z)
xlabel('x')
ylabel('y')
title('$\cos(x'2+y'2-0.5)-0.5$')
legend()
show()
```

No artists with labels found to put in legend. Note that artists whose label start with an underscore are ignored when legend() is called with no argument.

$\cos(x'2 + y'2 - 0.5) - 0.5$

In [22]:

```python
#Q9) Plot the function z=xe^(-x^2 -y^2) in -6<x,y<6
```
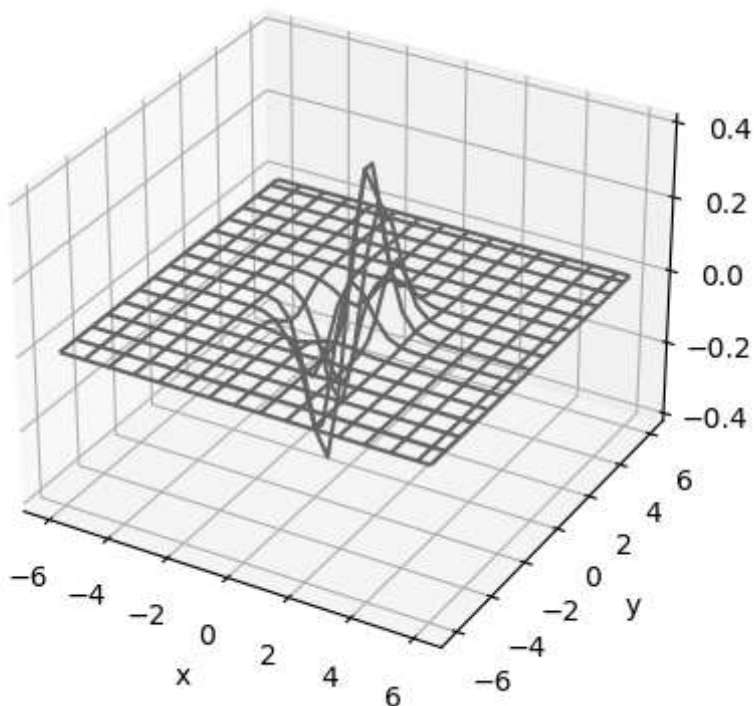
In [23]:

```python
from mpl_toolkits import mplot3d
import numpy as np

from pylab import*

def f(X,Y):
    return X*np.exp(-X**2-Y**2)
x=np.linspace(-6,6,30)
y=np.linspace(-6,6,30)
X,Y=np.meshgrid(x,y)
Z=f(X,Y)
ax=axes(projection='3d')
ax.plot_wireframe(X,Y,Z,rstride=2,cstride=2)
xlabel('x')
ylabel('y')
title('$z=xe'{-x'2-y'2}$')
legend()
show()
```

No artists with labels found to put in legend. Note that artists whose la bel start with an underscore are ignored when legend() is called with no a rgument.

$$z = xe' - x'2 - y'2$$

In [24]:

```python
#Q.10) Plot the function z=sin(x)+cos(y) in -5<x,y<5
```
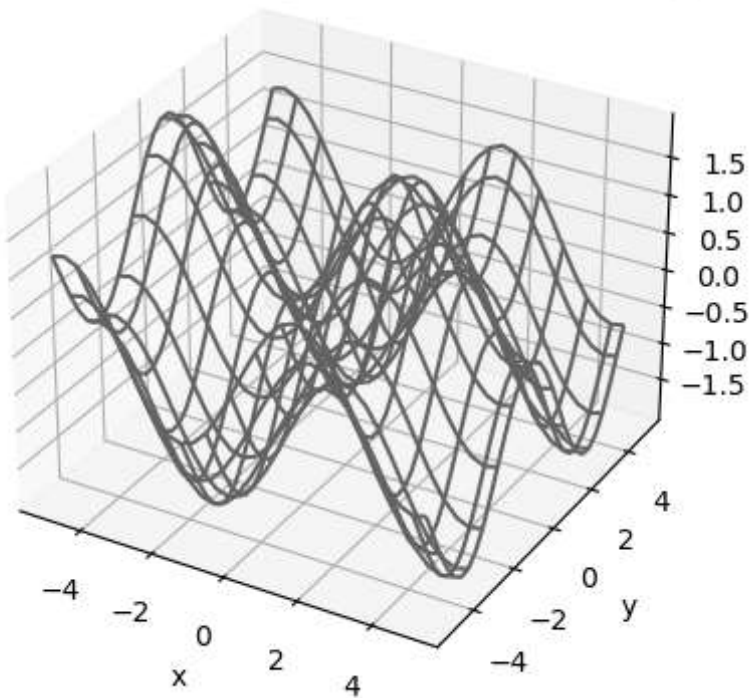
```python
from mpl_toolkits import mplot3d
import numpy as np

from pylab import*

def f(X,Y):
    return np.sin(X)+np.cos(Y)
x=np.linspace(-5,5,30)
y=np.linspace(-5,5,30)
X,Y=np.meshgrid(x,y)
Z=f(X,Y)
ax=axes(projection='3d')
ax.plot_wireframe(X,Y,Z,rstride=2,cstride=2)
xlabel('x')
ylabel('y')
title('$z=sin(x)=cos(y)$')
legend()
show()
```

No artists with labels found to put in legend. Note that artists whose la
bel start with an underscore are ignored when legend() is called with no a
rgument.

$$z = sin(x) = cos(y)$$

In [ ]: