2. Построить график поверхности $z = 1 - x^2 - y^2$ при $0 < x < 1$, $0 < y < 1$ с использованием функций shading interp, diffuse, colormap() и вычислить объем, заключенный между укзанной поверхностью и плоскостью z = 0 $\left(V \approx \sum \sum z(x_i, y_k)\Delta x_i \Delta y_k\right)$.

```
clear
clc
close all

x1 = linspace(0, 1)
```

```
x1 = 1×100
         0    0.0101    0.0202    0.0303    0.0404    0.0505    0.0606    0.0707 ···
```

```
x2 = linspace(0, 1)
```

```
x2 = 1×100
         0    0.0101    0.0202    0.0303    0.0404    0.0505    0.0606    0.0707 ···
```

```
[X1, X2] = meshgrid(x1, x2)
```

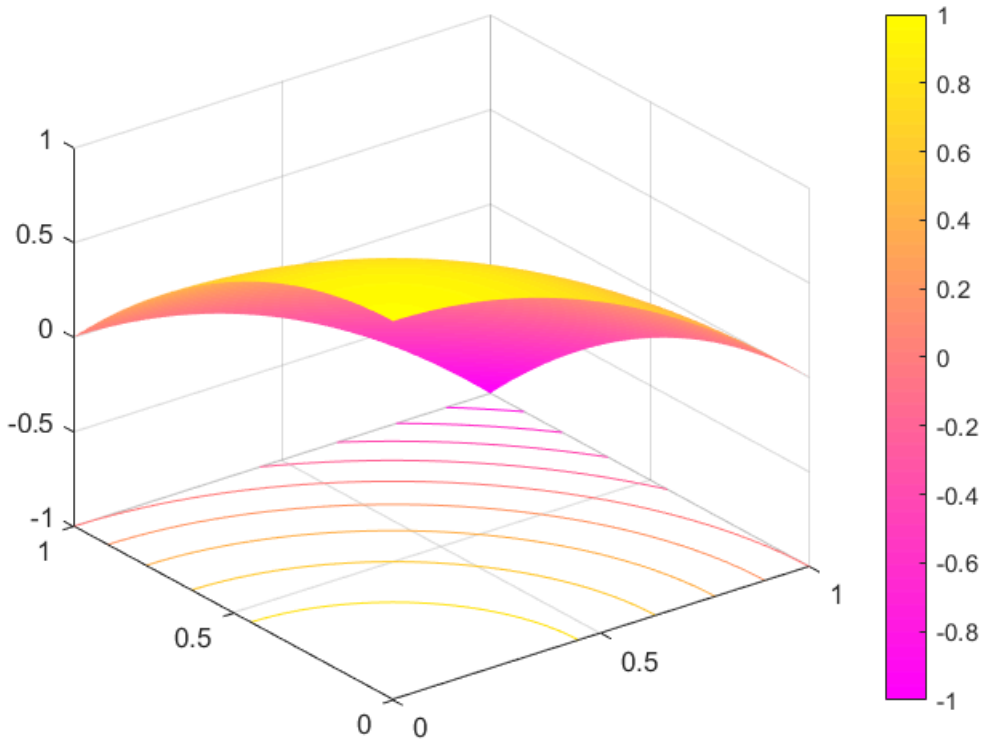
```
X1 = 100×100
         0    0.0101    0.0202    0.0303    0.0404    0.0505    0.0606    0.0707 ···
         0    0.0101    0.0202    0.0303    0.0404    0.0505    0.0606    0.0707
         0    0.0101    0.0202    0.0303    0.0404    0.0505    0.0606    0.0707
         0    0.0101    0.0202    0.0303    0.0404    0.0505    0.0606    0.0707
         0    0.0101    0.0202    0.0303    0.0404    0.0505    0.0606    0.0707
         0    0.0101    0.0202    0.0303    0.0404    0.0505    0.0606    0.0707
         0    0.0101    0.0202    0.0303    0.0404    0.0505    0.0606    0.0707
         0    0.0101    0.0202    0.0303    0.0404    0.0505    0.0606    0.0707
         0    0.0101    0.0202    0.0303    0.0404    0.0505    0.0606    0.0707
         0    0.0101    0.0202    0.0303    0.0404    0.0505    0.0606    0.0707
    ⋮

X2 = 100×100
         0         0         0         0         0         0         0         0 ···
    0.0101    0.0101    0.0101    0.0101    0.0101    0.0101    0.0101    0.0101
    0.0202    0.0202    0.0202    0.0202    0.0202    0.0202    0.0202    0.0202
    0.0303    0.0303    0.0303    0.0303    0.0303    0.0303    0.0303    0.0303
    0.0404    0.0404    0.0404    0.0404    0.0404    0.0404    0.0404    0.0404
    0.0505    0.0505    0.0505    0.0505    0.0505    0.0505    0.0505    0.0505
    0.0606    0.0606    0.0606    0.0606    0.0606    0.0606    0.0606    0.0606
    0.0707    0.0707    0.0707    0.0707    0.0707    0.0707    0.0707    0.0707
    0.0808    0.0808    0.0808    0.0808    0.0808    0.0808    0.0808    0.0808
    0.0909    0.0909    0.0909    0.0909    0.0909    0.0909    0.0909    0.0909
    ⋮
```

```
Z = 1 - X1.^2 - X2.^2
```

```
Z = 100×100
    1.0000    0.9999    0.9996    0.9991    0.9984    0.9974    0.9963    0.9950 ···
    0.9999    0.9998    0.9995    0.9990    0.9983    0.9973    0.9962    0.9949
    0.9996    0.9995    0.9992    0.9987    0.9980    0.9970    0.9959    0.9946
    0.9991    0.9990    0.9987    0.9982    0.9974    0.9965    0.9954    0.9941
    0.9984    0.9983    0.9980    0.9974    0.9967    0.9958    0.9947    0.9934
    0.9974    0.9973    0.9970    0.9965    0.9958    0.9949    0.9938    0.9924
    0.9963    0.9962    0.9959    0.9954    0.9947    0.9938    0.9927    0.9913
    0.9950    0.9949    0.9946    0.9941    0.9934    0.9924    0.9913    0.9900
```

```
    0.9935    0.9934    0.9931    0.9926    0.9918    0.9909    0.9898    0.9885
    0.9917    0.9916    0.9913    0.9908    0.9901    0.9892    0.9881    0.9867
      ⋮
```

```
figure
surfc(X1, X2, Z)
grid on
shading interp
colorbar
colormap spring
```




```
diffuse(X1, X2, Z, [2, 2, 2])
```

```
ans = 100×100
    0.5774    0.5832    0.5889    0.5946    0.6002    0.6058    0.6113    0.6168 ···
    0.5832    0.5890    0.5947    0.6004    0.6060    0.6116    0.6172    0.6226
    0.5889    0.5947    0.6005    0.6061    0.6118    0.6174    0.6229    0.6284
    0.5946    0.6004    0.6061    0.6118    0.6175    0.6231    0.6286    0.6341
    0.6002    0.6060    0.6118    0.6175    0.6231    0.6287    0.6343    0.6398
    0.6058    0.6116    0.6174    0.6231    0.6287    0.6343    0.6399    0.6454
    0.6113    0.6172    0.6229    0.6286    0.6343    0.6399    0.6454    0.6510
    0.6168    0.6226    0.6284    0.6341    0.6398    0.6454    0.6510    0.6565
    0.6223    0.6281    0.6339    0.6396    0.6452    0.6509    0.6564    0.6620
    0.6276    0.6335    0.6392    0.6450    0.6506    0.6563    0.6619    0.6674
      ⋮
```

```
V = 0.01*0.01*sum(sum(Z(:)))
```

```
V = 0.3300
```