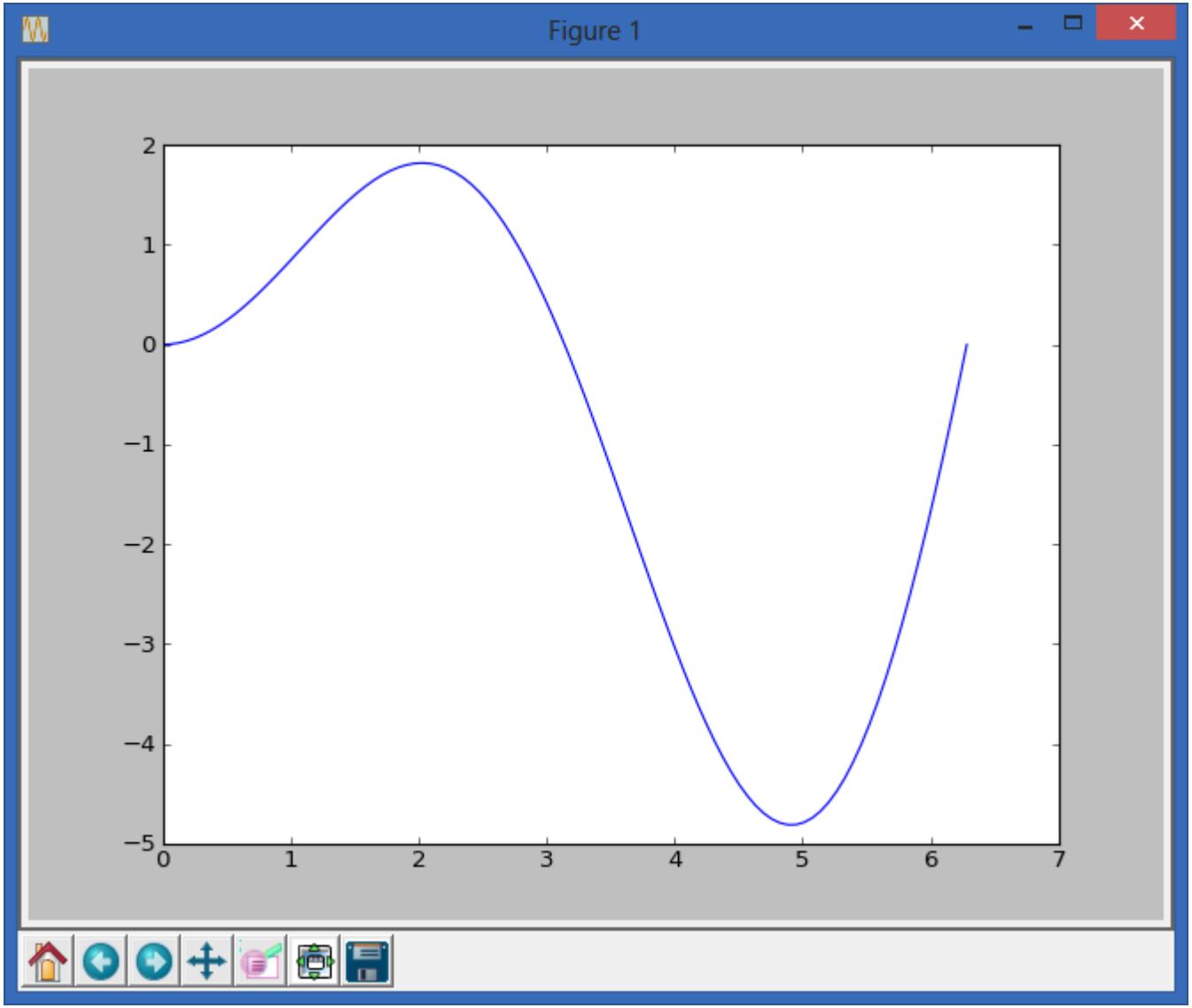
Εισαγωγή στην Επιστήμη των Υπολογιστών

Γραφική παράσταση (1)

```
import numpy as np

# Pyplot is a module within the matplotlib library for plotting
import matplotlib.pyplot as plt

# Create an array of 100 linearly-spaced points from 0 to 2*pi
x = np.linspace(0,2*np.pi,100)
y = np.sin(x)*x

# Create the plot
plt.plot(x,y)

# Draw the plot to the screen
plt.show()
```

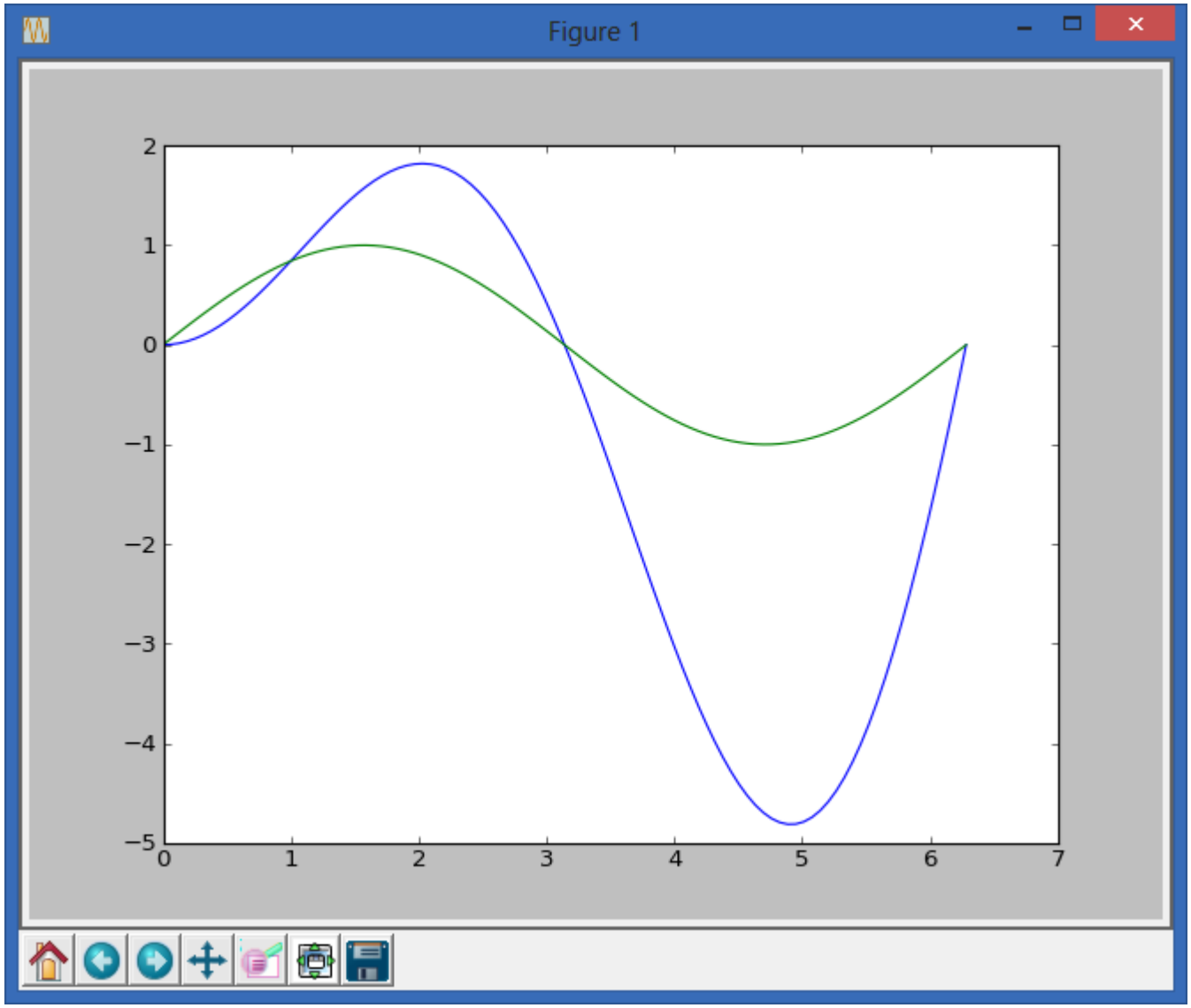
Γραφική παράσταση (2)



Γραφική παράσταση (3)

```
import numpy as np
import matplotlib.pyplot as plt

# Create an array of 100 linearly-spaced points from 0 to 2*pi
x = np.linspace(0,2*np.pi,100)
y = np.sin(x)*x
z = np.sin(x)

# Create the plot
plt.plot(x,y)
plt.plot(x,z)

# Draw the plot to the screen
plt.show()
```

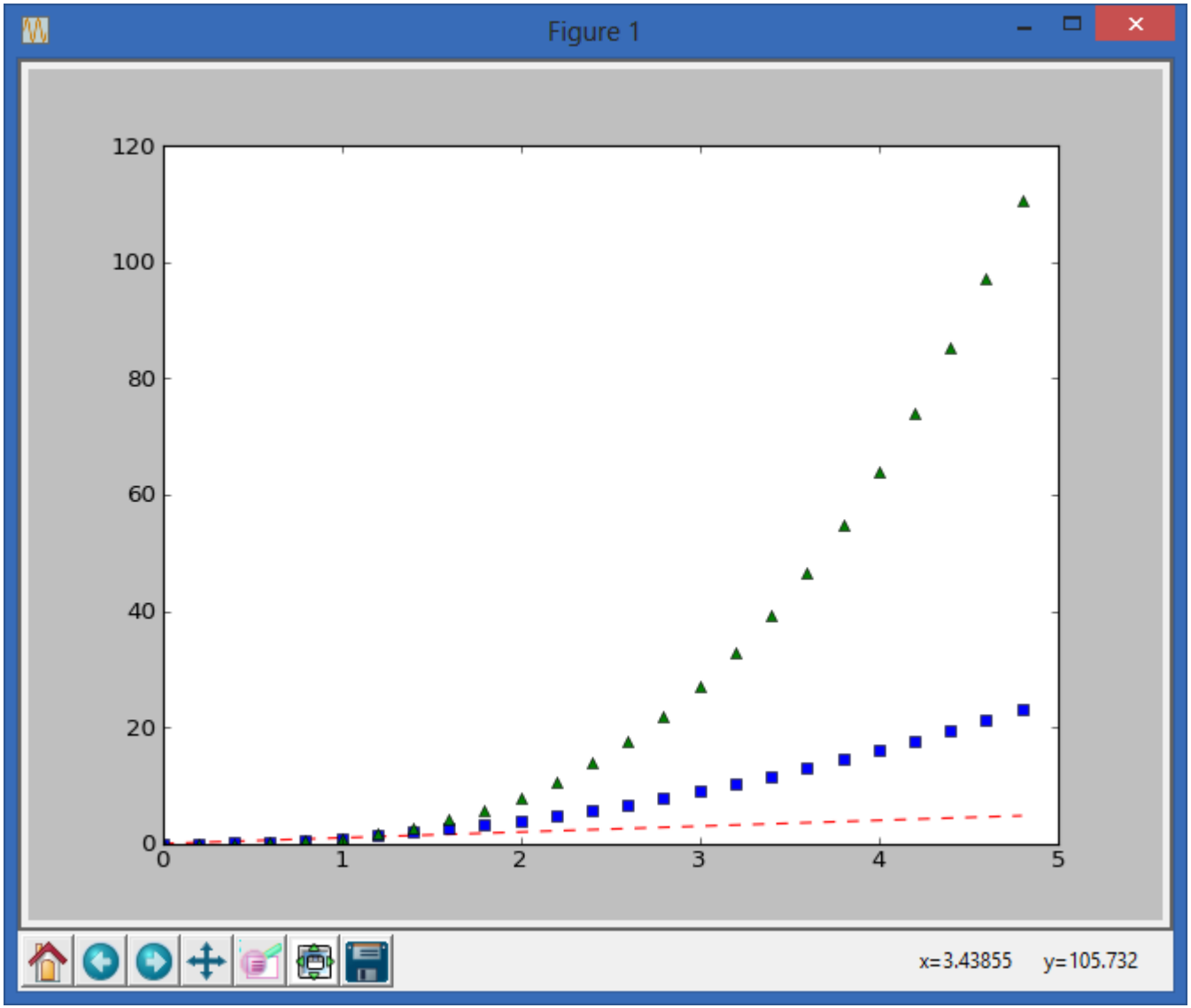
Γραφική παράσταση (4)



Γραφική παράσταση (5)

```
import numpy as np
import matplotlib.pyplot as plt

# evenly sampled time at 200ms intervals
t = np.arange(0., 5., 0.2)

# red dashes, blue squares and green triangles
plt.plot(t, t, 'r--', t, t**2, 'bs', t, t**3, 'g^')

plt.show()
```

Γραφική παράσταση (6)



Γραφική παράσταση (7)

```
import numpy as np
import matplotlib.pyplot as plt

def f(t):
    return np.exp(-t) * np.cos(2*np.pi*t)

t1 = np.arange(0.0, 5.0, 0.1)
t2 = np.arange(0.0, 5.0, 0.02)
```

Γραφική παράσταση (8)

```
plt.figure(1)
plt.subplot(211)
plt.plot(t1, f(t1), 'bo', t2, f(t2), 'k')

plt.subplot(212)
plt.plot(t2, np.cos(2*np.pi*t2), 'r--')

plt.show()
```

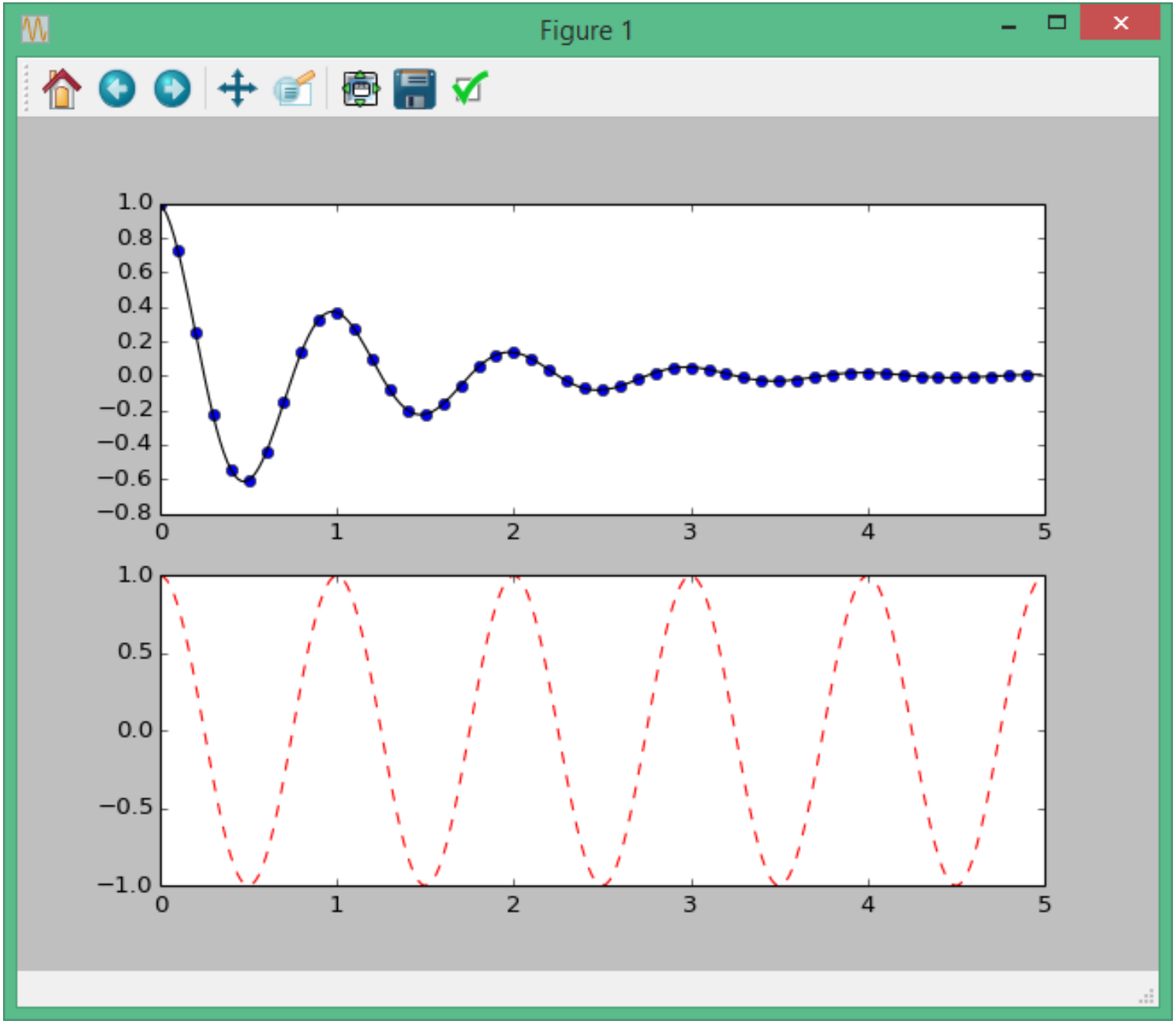


Figure 1
1.0
0.8
0.6
0.4
0.2
0.0
−0.2
−0.4
−0.6
−0.8
0
1
2
3
4
5
1.0
0.5
0.0
−0.5
−1.0
0
1
2
3
4
5

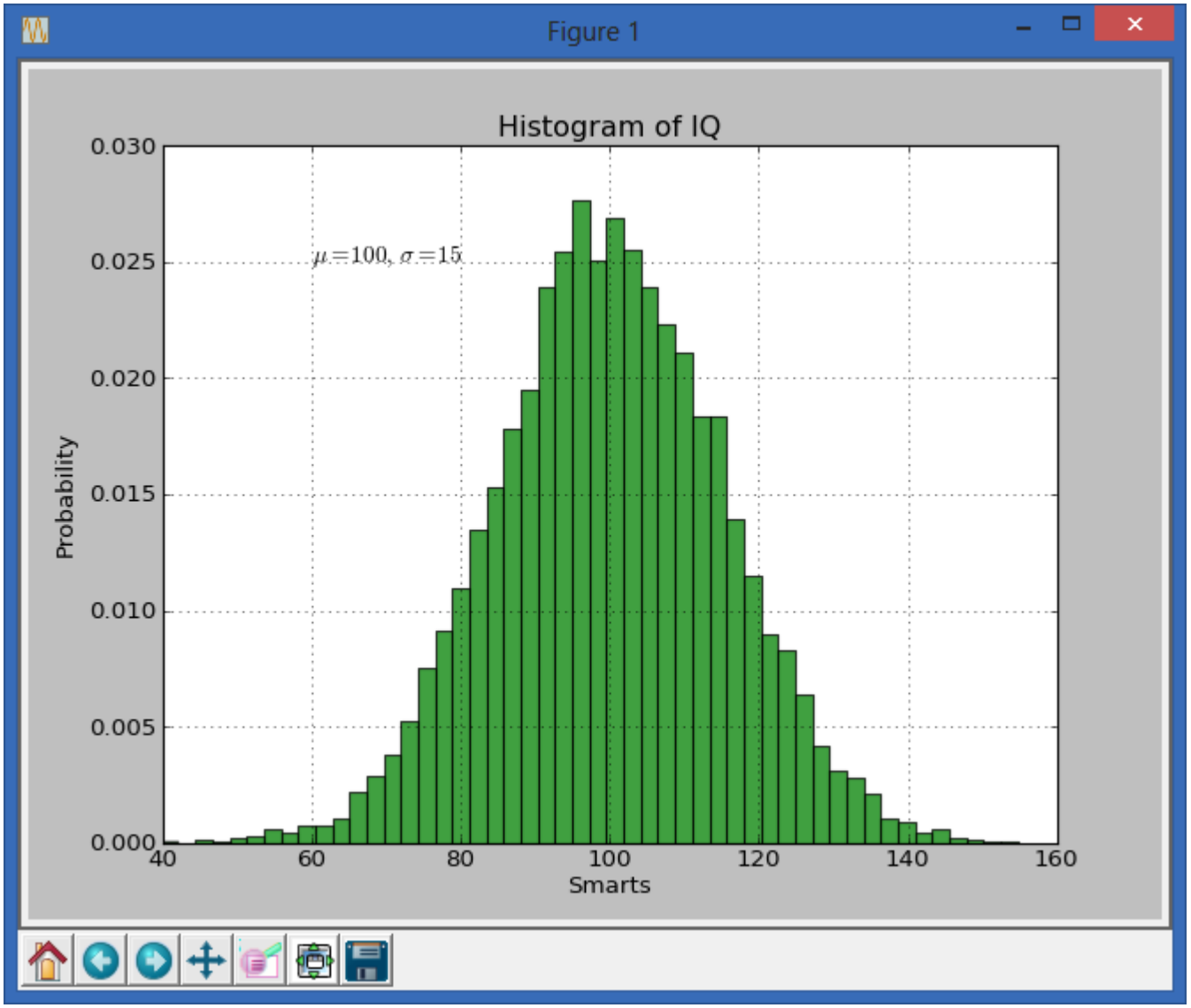
Ιστόγραμμα (1)

```
import numpy as np
import matplotlib.pyplot as plt

mu, sigma = 100, 15
x = mu + sigma * np.random.randn(10000)

# the histogram of the data
n, bins, patches = plt.hist(x, 50, normed=1,
facecolor='g', alpha=0.75)
```

Ιστόγραμμα (2)

```
plt.xlabel('Smarts')
plt.ylabel('Probability')
plt.title('Histogram of IQ')
plt.text(60, .025, r'$\mu=100,\ \sigma=15$')
plt.axis([40, 160, 0, 0.03])
plt.grid(True)

plt.show()
```

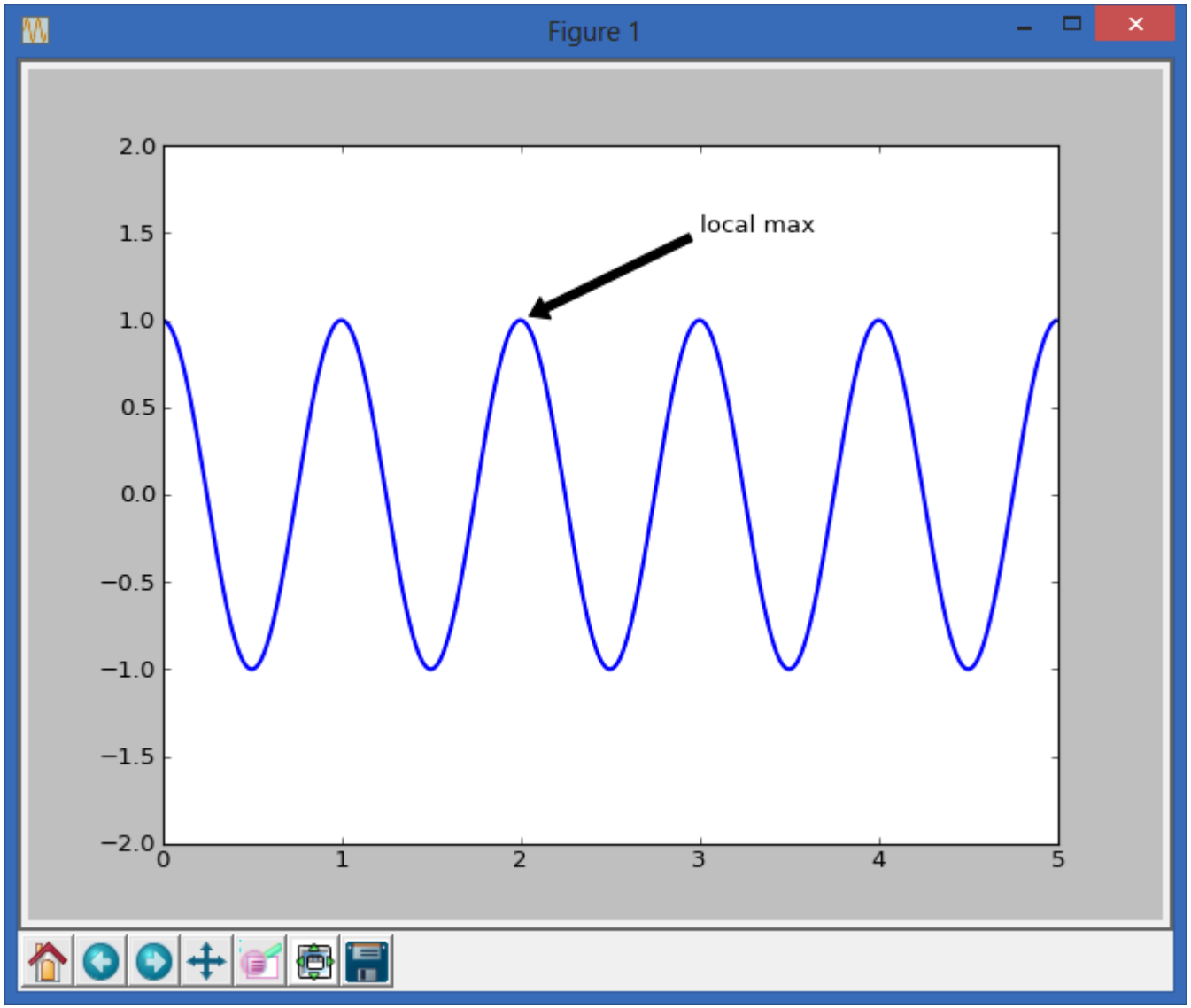
Ιστόγραμμα (3)



Εισαγωγή κειμένου (1)

```
import numpy as np
import matplotlib.pyplot as plt

ax = plt.subplot(111)

t = np.arange(0.0, 5.0, 0.01)
s = np.cos(2*np.pi*t)
line, = plt.plot(t, s, lw=2)

plt.annotate('local max', xy=(2, 1), xytext=(3, 1.5),
        arrowprops=dict(facecolor='black', shrink=0.05),
        )

plt.ylim(-2,2)
plt.show()

plt.show()
```

Εισαγωγή κειμένου (2)



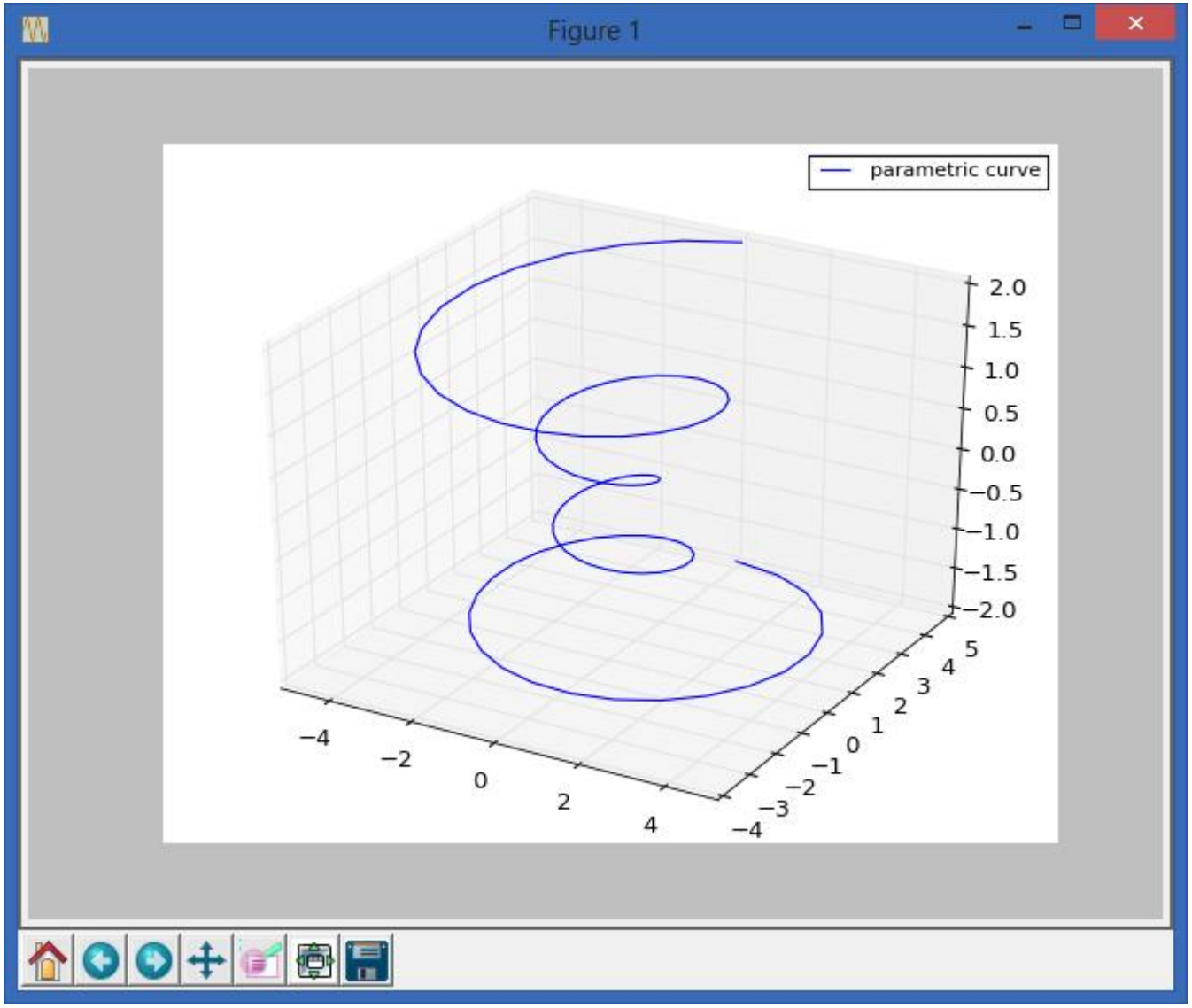
Γραφική παράσταση 3d (1)

```
import matplotlib as mpl
from mpl_toolkits.mplot3d import Axes3D
import numpy as np
import matplotlib.pyplot as plt

mpl.rcParams['legend.fontsize'] = 10

fig = plt.figure()
ax = fig.gca(projection='3d')
theta = np.linspace(-4 * np.pi, 4 * np.pi, 100)
```

Γραφική παράσταση 3d (2)

```
z = np.linspace(-2, 2, 100)
r = z**2 + 1
x = r * np.sin(theta)
y = r * np.cos(theta)
ax.plot(x, y, z, label='parametric curve')
ax.legend()

plt.show()
```

Γραφική παράσταση 3d (3)



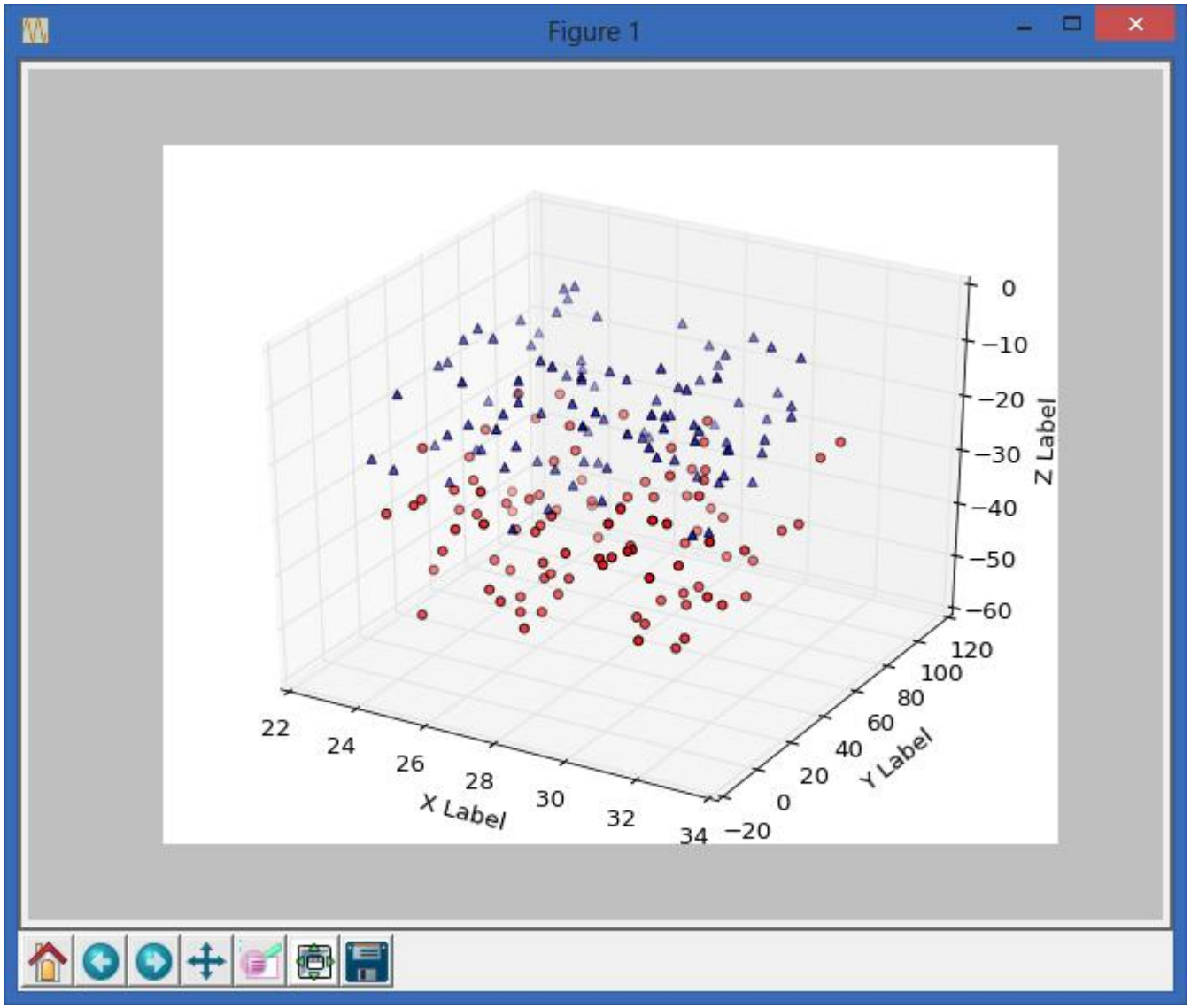
Scatter plot 3d(1)

```
import numpy as np
from mpl_toolkits.mplot3d import Axes3D
import matplotlib.pyplot as plt

def randrange(n, vmin, vmax):
    return (vmax-vmin)*np.random.rand(n) + vmin

fig = plt.figure()
ax = fig.add_subplot(111, projection='3d')
n = 100
```

Scatter plot 3d(2)

```
for c, m, zl, zh in [('r', 'o', -50, -25), ('b', '^', -30, -5)]:
    xs = randrange(n, 23, 32)
    ys = randrange(n, 0, 100)
    zs = randrange(n, zl, zh)
    ax.scatter(xs, ys, zs, c=c, marker=m)

ax.set_xlabel('X Label')
ax.set_ylabel('Y Label')
ax.set_zlabel('Z Label')

plt.show()
```

Scatter plot 3d(3)



Ραβδόγραμμα 3d (1)

```
from mpl_toolkits.mplot3d import Axes3D
import matplotlib.pyplot as plt
import numpy as np

fig = plt.figure()
ax = fig.add_subplot(111, projection='3d')
for c, z in zip(['r', 'g', 'b', 'y'], [30, 20, 10, 0]):
    xs = np.arange(20)
    ys = np.random.rand(20)
```

Ραβδόγραμμα 3d (2)

```
 # You can provide either a single color or an array. To demonstrate this,
    # the first bar of each set will be colored cyan.
    cs = [c] * len(xs)
    cs[0] = 'c'
    ax.bar(xs, ys, zs=z, zdir='y', color=cs, alpha=0.8)

ax.set_xlabel('X')
ax.set_ylabel('Y')
ax.set_zlabel('Z')

plt.show()
```

Ραβδόγραμμα 3d (3)