

# PROGRAMMING FOR DATA SCIENCE (WITH PYTHON)

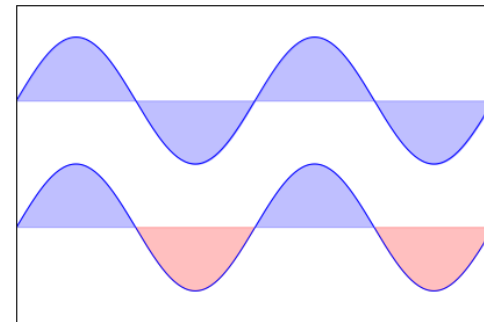
## Lab 6

### 1. Pandas

<http://pandas.pydata.org/pandas-docs/stable/10min.html#min>

### 2. Plot and filled plots

```
import numpy as np
import matplotlib.pyplot as plt
n = 256
X = np.linspace(-np.pi, np.pi, n, endpoint=True)
Y = np.sin(2 * X)
plt.axes([0.025, 0.025, 0.95, 0.95])
plt.plot(X, Y + 1, color='blue', alpha=1.00)
plt.fill_between(X, 1, Y + 1, color='blue', alpha=.25)
plt.plot(X, Y - 1, color='blue', alpha=1.00)
plt.fill_between(X, -1, Y - 1, (Y - 1) > -1, color='blue', alpha=.25)
plt.fill_between(X, -1, Y - 1, (Y - 1) < -1, color='red', alpha=.25)
plt.xlim(-np.pi, np.pi)
plt.xticks(())
plt.ylim(-2.5, 2.5)
```



```
plt.yticks()
```

```
plt.show()
```

### 3. Plot and filled plots

```
import numpy as np
```

```
import matplotlib.pyplot as plt
```

```
def f(x,y):
```

```
    return (1 - x / 2 + x**5 + y**3) * np.exp(-x**2 -y**2)
```

```
n = 256
```

```
x = np.linspace(-3, 3, n)
```

```
y = np.linspace(-3, 3, n)
```

```
X,Y = np.meshgrid(x, y)
```

```
plt.axes([0.025, 0.025, 0.95, 0.95])
```

```
plt.contourf(X, Y, f(X, Y), 8, alpha=.75, cmap=plt.cm.hot)
```

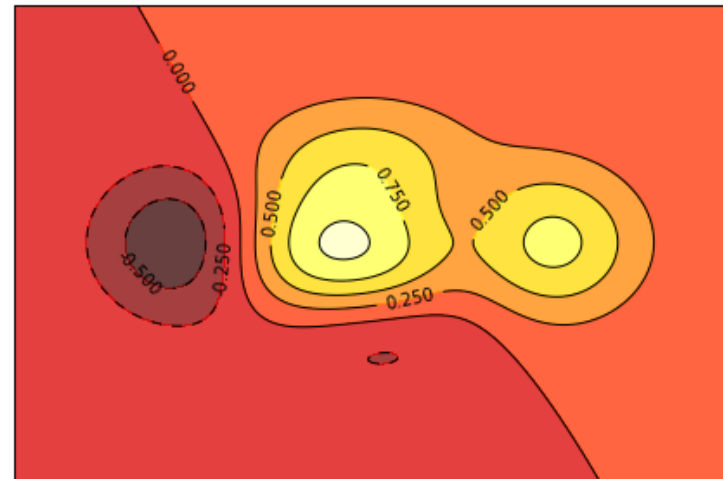
```
C = plt.contour(X, Y, f(X, Y), 8, colors='black', linewidth=.5)
```

```
plt.clabel(C, inline=1, fontsize=10)
```

```
plt.xticks()
```

```
plt.yticks()
```

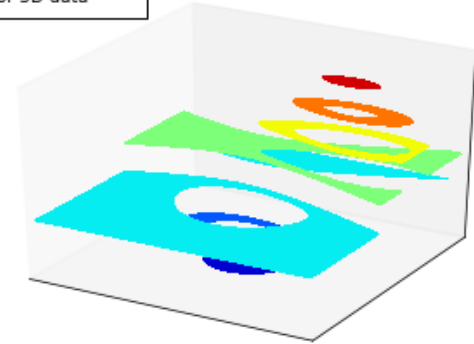
```
plt.show()
```



## 4. 3D plotting

```
import matplotlib.pyplot as plt
from mpl_toolkits.mplot3d import axes3d
ax = plt.gca(projection='3d')
X, Y, Z = axes3d.get_test_data(0.05)
cset = ax.contourf(X, Y, Z)
ax.clabel(cset, fontsize=9, inline=1)
plt.xticks(())
plt.yticks(())
ax.set_zticks(())
ax.text2D(-0.05, 1.05, " 3D plots      \n",
          horizontalalignment='left',
          verticalalignment='top',
          bbox=dict(facecolor='white', alpha=1.0),
          family='Lint McCree Intl BB',
          size='x-large',
          transform=plt.gca().transAxes)
ax.text2D(-0.05, .975, " Plot 2D or 3D data",
          horizontalalignment='left',
          verticalalignment='top',
          family='Lint McCree Intl BB',
          size='medium',
```

3D plots  
Plot 2D or 3D data



<pre>transform=plt.gca().transAxes) plt.show()</pre>	
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