

# **Introduction to High Performance Scientific Computing**

**Autumn, 2017**

**Python lecture 4**

# 2d plots

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- **Matplotlib package provides Matlab-like plotting**
- **Usually included in scripts as:** `import matplotlib.pyplot as plt`
- **Will look at illustrative example here and provide supplementary python code**

# 2d plots: simple example

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- Create and plot 2 simple functions

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

#Create some arrays to be plotted
Nx = 100
Ny = 200
x = np.linspace(0.0, np.pi, Nx)
y = np.linspace(-np.pi, np.pi, Ny)

f = np.sin(x)
g = np.cos(y)
```

# 2d plots: simple example

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y = np.linspace(-np.pi,np.pi,Ny)

f = np.sin(x)
g = np.cos(y)

#Create plot
plt.figure() #make new figure

plt.plot(x,f,'b-',label='sin') #blue line
plt.plot(y,g,'r--',label='cos') #red dashed line
```

# 2d plots: simple example

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```

```
plt.figure() #make new figure
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plt.plot(x,f,'b-',label='sin') #blue line
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plt.plot(y,g,'r--',label='cos') #red dashed line
```

```
#add axis labels, legend, and figure title
```

```
plt.xlabel('time')
```

```
plt.ylabel('f(t),g(t)')
```

```
plt.legend(loc='best')
```

```
plt.title('Illustrative figure prepared by Prasun Ray')
```

# 2d plots: simple example

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plt.title('Illustrative figure prepared by Prasun Ray')
```

```
#adjust x-axis limits, turn on grid, display and save figure
```

```
plt.xlim(0,np.pi)
```

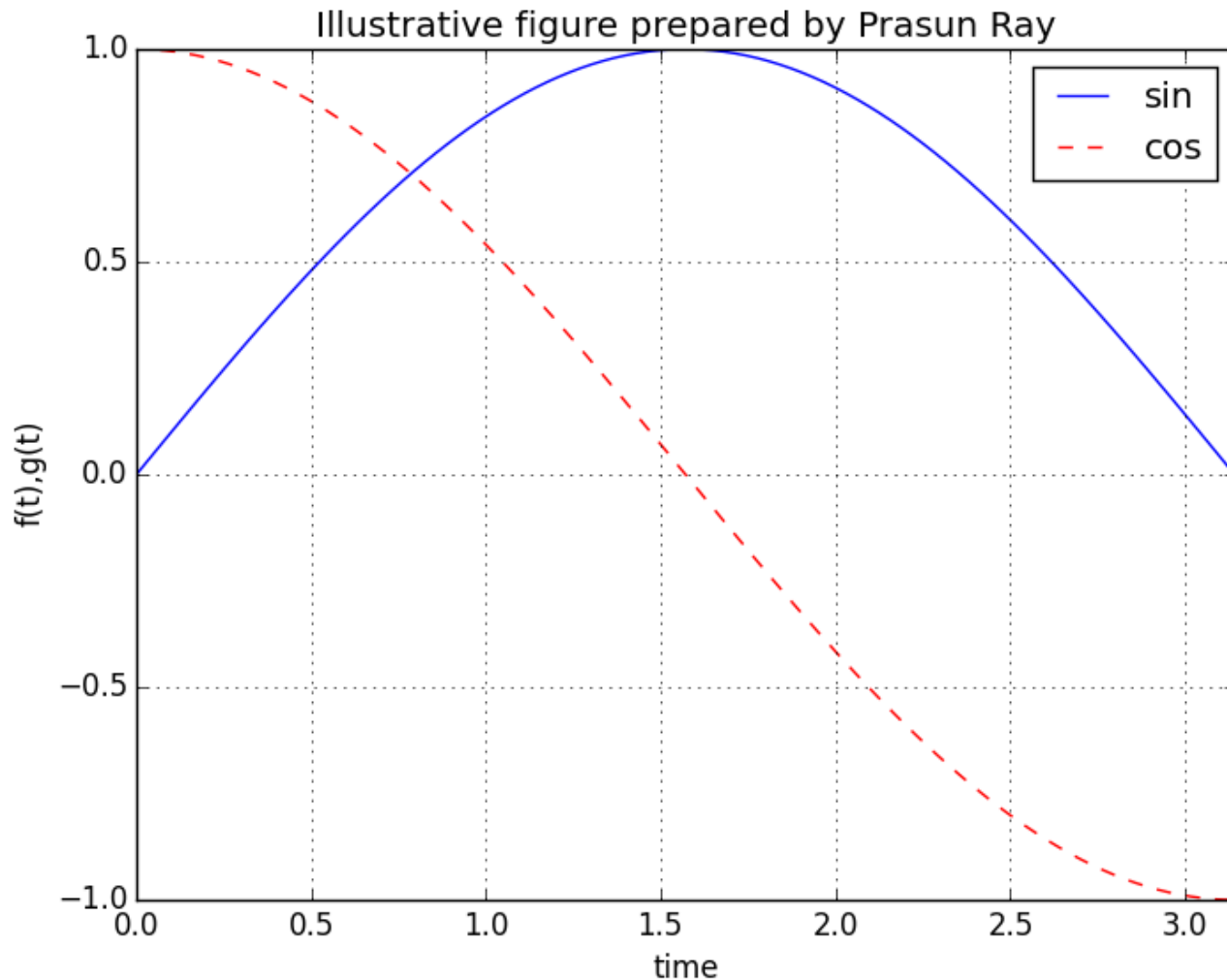
```
plt.grid()
```

```
plt.show()
```

```
plt.savefig('plot_example.png')
```

# 2d plots: simple example

- Create and plot 2 simple functions
- *plot\_example.png*:



# 2d plots

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- **Use** loglog, semilogx, semilogy **for logarithmic axes**
- **contour for functions of two variables**
- **hold(True) or hold(False) to overlay curves on single figure (or not)**
- **Example code in repo: *plot\_example.py***
- **See online tutorial for further info:**  
[http://matplotlib.org/users/pyplot\\_tutorial.html](http://matplotlib.org/users/pyplot_tutorial.html)
- **Also look at: <http://matplotlib.org/gallery.html>**  
**(includes complex figures + code that generates them)**