Python + Emacs in Scientific computing

Scipy 2013

2013-12-14 Sat

1 Mathematical operations in Python

1.1 Square root

```
1:  # ---------------------
2:  import numpy as np
3:  print np.sqrt(2)
4:  # ---------------------
```

1.41421356237

1.2 Logarithm

```
1:  # --------------------------------
2:  import numpy as np
3:  print np.log(10)
4:  print np.log10(10)  # base10
5:  # --------------------------------
```

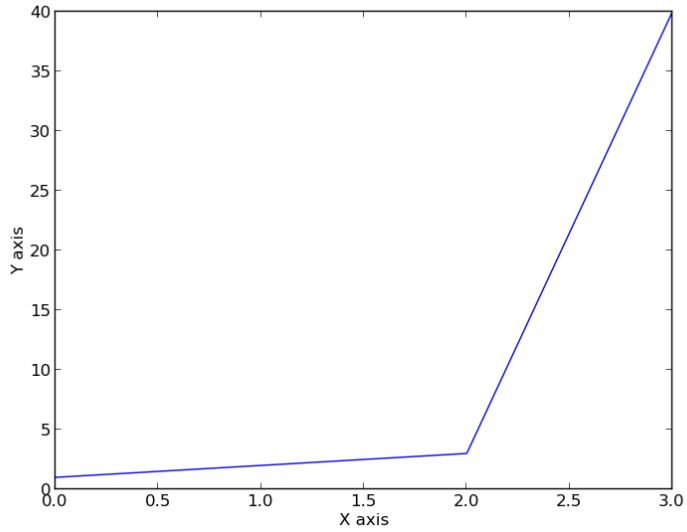
2.30258509299 1.0

1.3 Plots

- Example-1

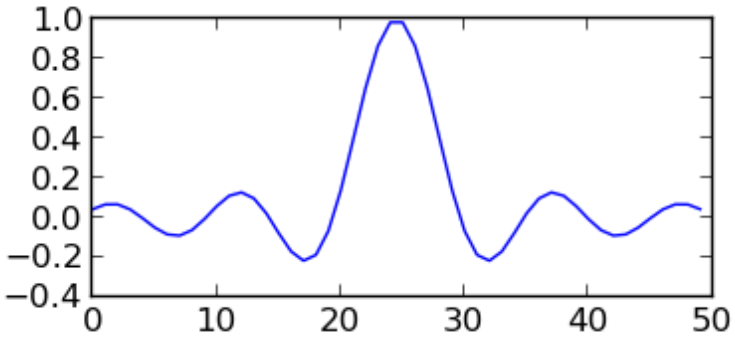
```
1:  # ------------------------------------------------------------
2:  import matplotlib.pyplot as plt
3:  plt.plot([1,2,3,40])
4:  plt.ylabel('Y axis')
5:  plt.xlabel('X axis')
6:  plt.savefig(fname)
```

```
7:
8:  return fname                        # return filename to org-mode
9:  # ------------------------------------------------------------
```



- Example-2

```
1:  # ------------------------------------------------------------
2:  import matplotlib, numpy
3:  matplotlib.use('Agg')
4:  import matplotlib.pyplot as plt
5:  fig=plt.figure(figsize=(4,2))
6:  x=numpy.linspace(-15,15)
7:  plt.plot(numpy.sin(x)/x)
8:  fig.tight_layout()
9:  plt.savefig('images/python-matplot-fig.png')
10: return 'images/python-matplot-fig.png' # return filename to org-mode
11: # ------------------------------------------------------------
```



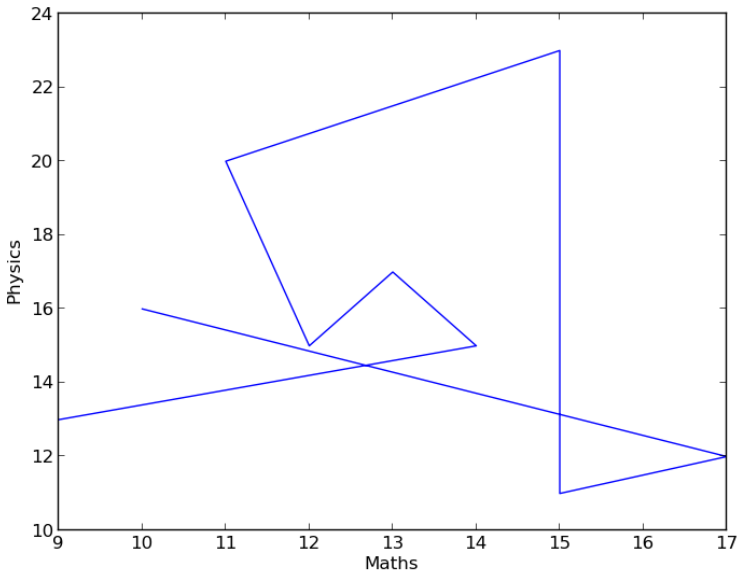
2 Data

2.1 Table: Student marks

Student	Maths	Physics	Mean
Bertrand	13	09	
Henri	15	14	
Arnold	17	13	
Sam	15	12	
Emmy	20	11	
Roy	23	15	
Victor	11	15	
Robert	12	17	
Harper	16	10	
Mean			0

```
1:  # ------------------------------------------------------------
2:  maths=[]
3:  physics=[]
4:  mean=[]
5:  for i in marks[1:-1]:
6:      maths.append(i[1])
7:      physics.append(i[2])
8:      mean.append(i[3])
9:
10: import matplotlib.pyplot as plot
11: plot.plot(physics,maths)
12: plot.ylabel('Physics')
```

```
13:  plot.xlabel('Maths')
14:  plot.savefig('marks.png')
15:
16:  return 'marks.png'
17:  # --------------------------------------------------------------
```



2.2 Table: VI characteristics of diode marks

V(volts)	I(mA)	V/I
0.21	0.21	.
0.41	0.41	.
0.61	0.61	.
0.81	0.81	.
1.09	1.09	.
1.20	1.20	.

```
1:  # --------------------------------------------------------------
2:  v=[]
3:  i=[]
4:  for reading in readings[1:]:
5:      v.append(reading[1])
6:      i.append(reading[2])
```

```
 7:
 8:  import matplotlib.pyplot as plt
 9:  plt.plot(i,v)
10:  plt.ylabel('I')
11:  plt.xlabel('V')
12:  plt.savefig('iv.png')
13:
14:  return 'iv.png'
15:  # ------------------------------------------------------------
```