Física Computacional I

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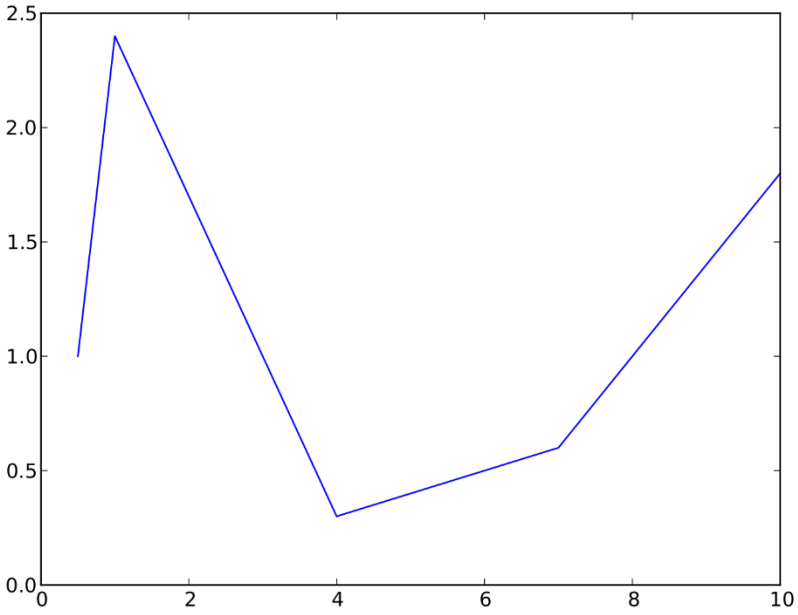
- Sintaxe: plot(x,y)
  - x e y são listas ou vetores
- Exemplo:

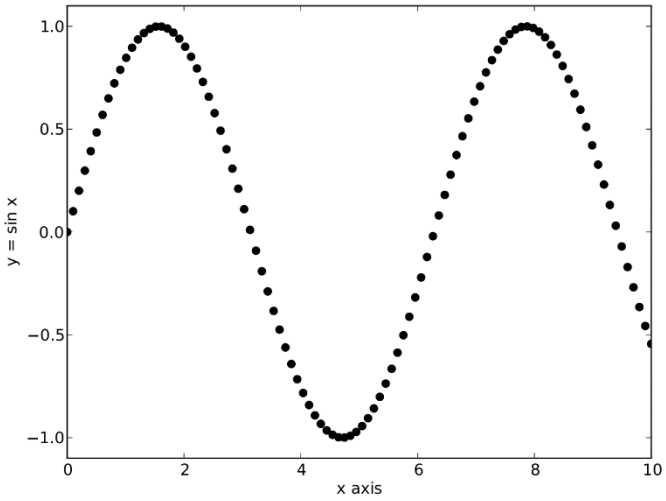
```
from pylab import *
x = [0.5, 1.0, 2.0, 4.0, 7.0, 10.0]
y = [1.0, 2.4, 1.7, 0.3, 0.6, 1.8]
plot(x,y)
savefig('grafico.png')
show()
```

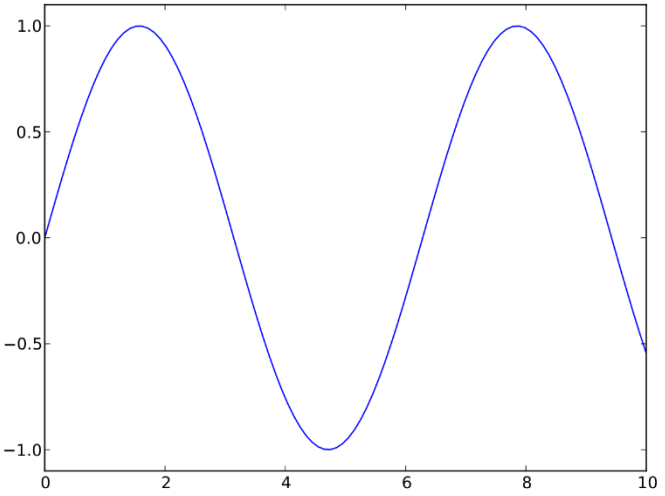


Usando linspace para obter gráfico de funções

- Sintaxe: linspace(a,b,num)
  - linspace(0.0,10.0,100)
- Exemplo: gráfico do seno

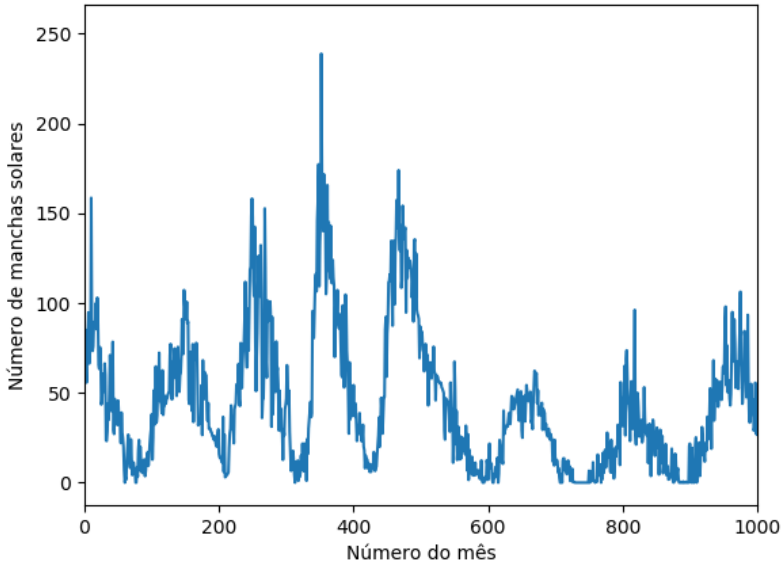
```
from numpy import sin,linspace
from pylab import plot,show
x = linspace(0.0,10.0,100)
y = sin(x)
plot(x,y)
show()
```





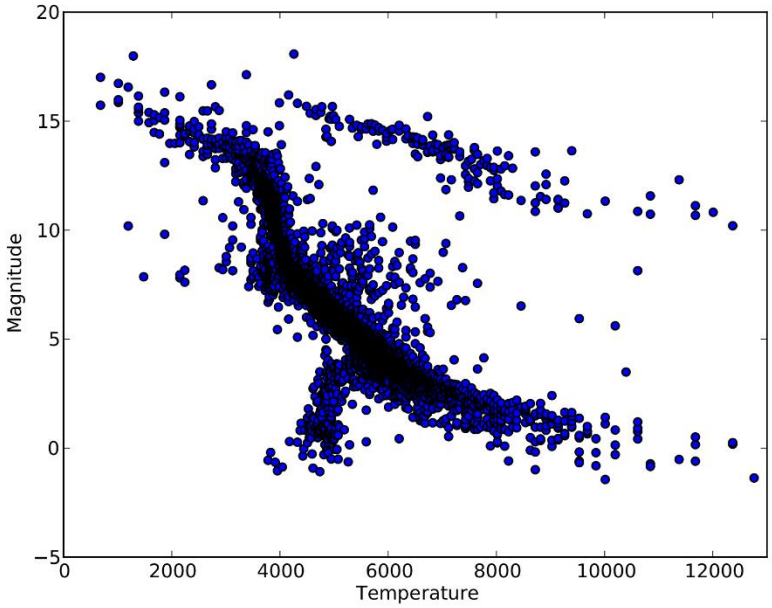
- Exemplo:

```
from numpy import loadtxt
from pylab import *
dados = loadtxt("sunspots.txt")
x = dados[:,0]
y = dados[:,1]
plot(x,y)
savefig('sunspots.png')
show()
```



- Exemplo:

```
from numpy import loadtxt
from pylab import *
dados = loadtxt("stars.txt")
x = dados[:,0]
y = dados[:,1]
scatter(x,y)
show()
```

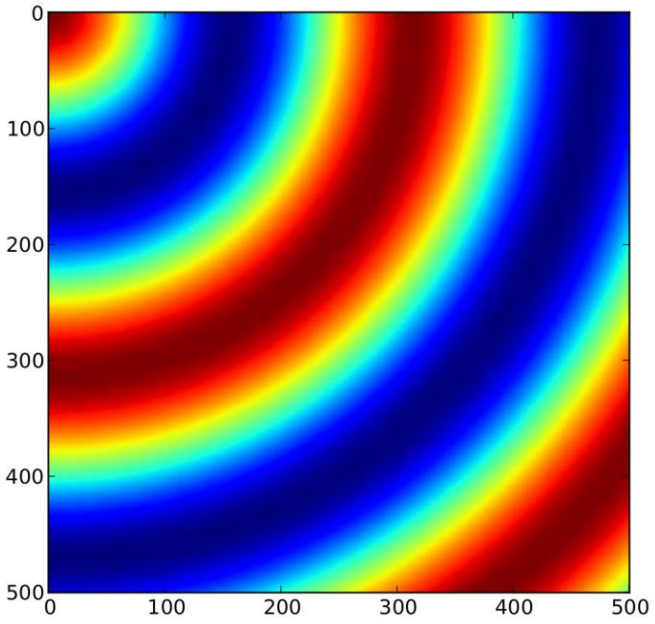


- Exemplo:

```
from numpy import loadtxt
dados = loadtxt("circular.txt")
imshow(dados)
show()
```

```
0.0050 0.0233 0.0515 0.0795 0.1075 ...
0.0233 0.0516 0.0798 0.1078 0.1358 ...
0.0515 0.0798 0.1080 0.1360 0.1639 ...
0.0795 0.1078 0.1360 0.1640 0.1918 ...
0.1075 0.1358 0.1639 0.1918 0.2195 ...
  ...    ...    ...    ...    ...
```

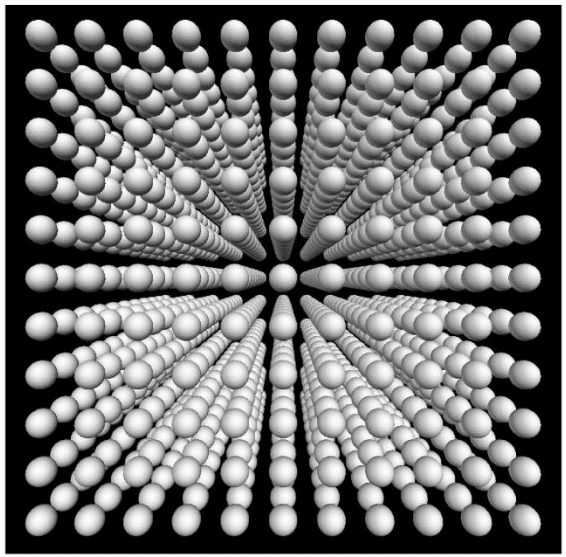
- Origem no canto superior esquerdo



- pip install vpython
- Sintaxe diferente da versão anterior (usada no Newman)
- Exemplo:

```
from vpython import sphere,color,vector
s=sphere(radius=0.5,pos=vector(1.0,-0.2,0.0),color=color.green)
```

- Exemplo 2:



```
from vpython import sphere,rate,vector
from numpy import arange
s = sphere(pos=vector(0,0,0),radius=0.1)
for posicao in arange(0,10,0.01):
    rate(30)
    s.pos= vector(posicao,0,0)
```

- rate(x)
  - Programa espera 1/x segundos antes de passar para linha seguinte