exo_numpy

October 24, 2018

In [1]:
```
%matplotlib inline
from numpy import *
import numpy as np
from matplotlib.pyplot import *
```

1 Formule de Simpson

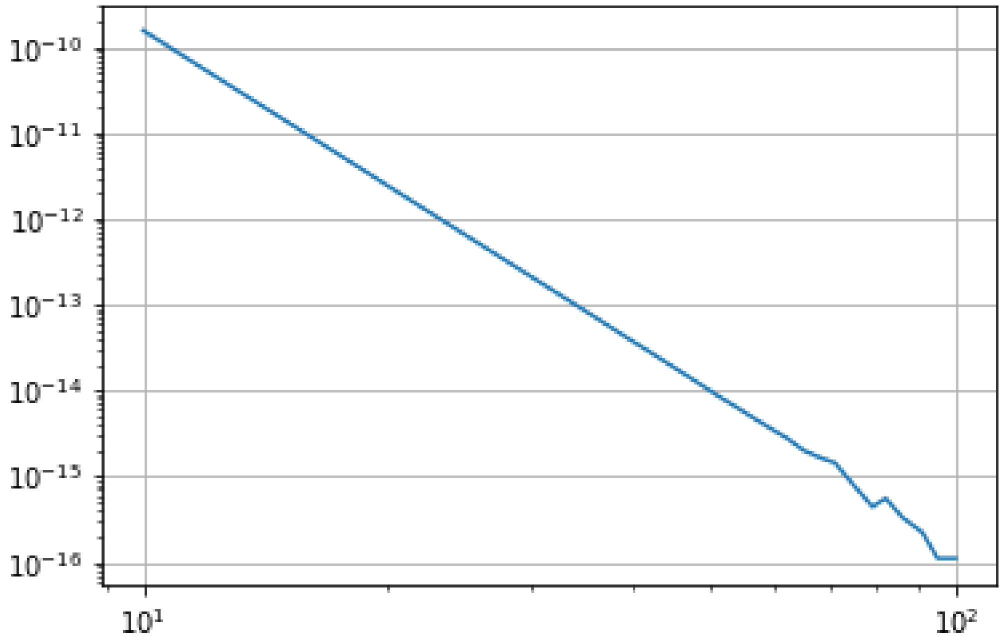
In [2]:
```
def simpson(f, a, b, N):
    delta_x = (b-a)/N
    x = a + arange(N)*delta_x
    return np.sum(delta_x * (f(x) + 4*f(x+delta_x/2) + f(x+delta_x))/6)

simpson(lambda x:1/(1+x**2), 0, 1, 100)
```

Out[2]: 0.78539816339744817

In [3]:
```
N_list=logspace(1,2,dtype=int)

l=[simpson(lambda x:1/(1+x**2), 0, 1, N) for N in N_list]
l=array(l)
loglog(N_list,abs(l-pi/4))
grid()
```



2 Loi de Poisson

```
In [4]: fichier="100secondes_200us_count.txt"
        data=loadtxt(fichier, dtype=int)
        duree_mesure=100
        nombre_moyen_photons=np.sum(data)/duree_mesure
        print(nombre_moyen_photons)
```

```
22972.79
```

```
In [5]: h = 6.6E-34
        c = 3E8
        lamb = 550E-9
        nombre_moyen_photons * h * c / lamb
```

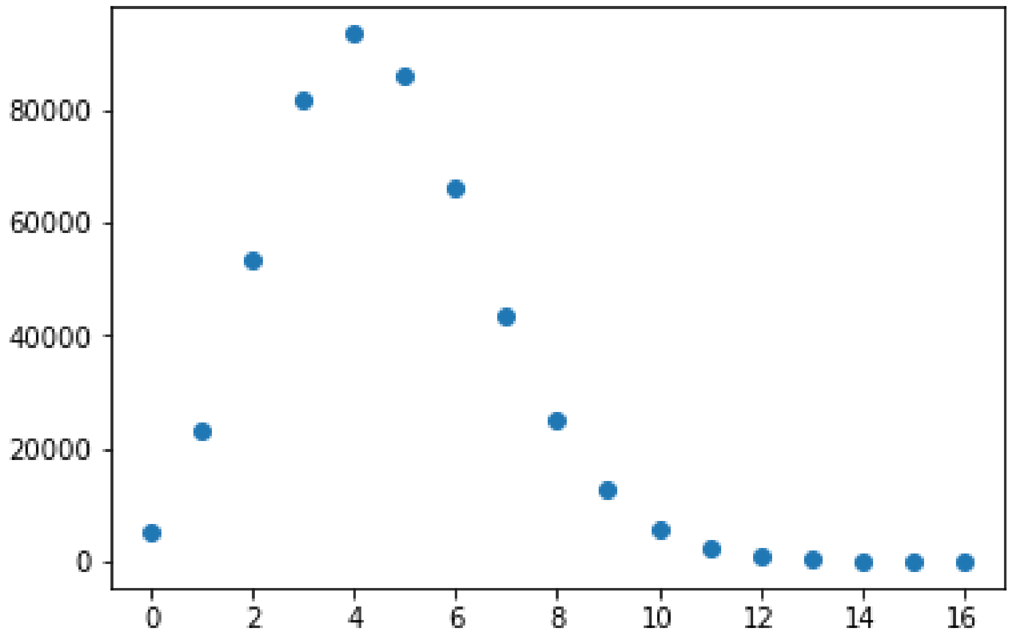
```
Out[5]: 8.2702044000000002e-15
```

```
In [6]: print(std(data))
        print(sqrt(data.mean()))
```

```
2.14011560076
2.14349201072
```

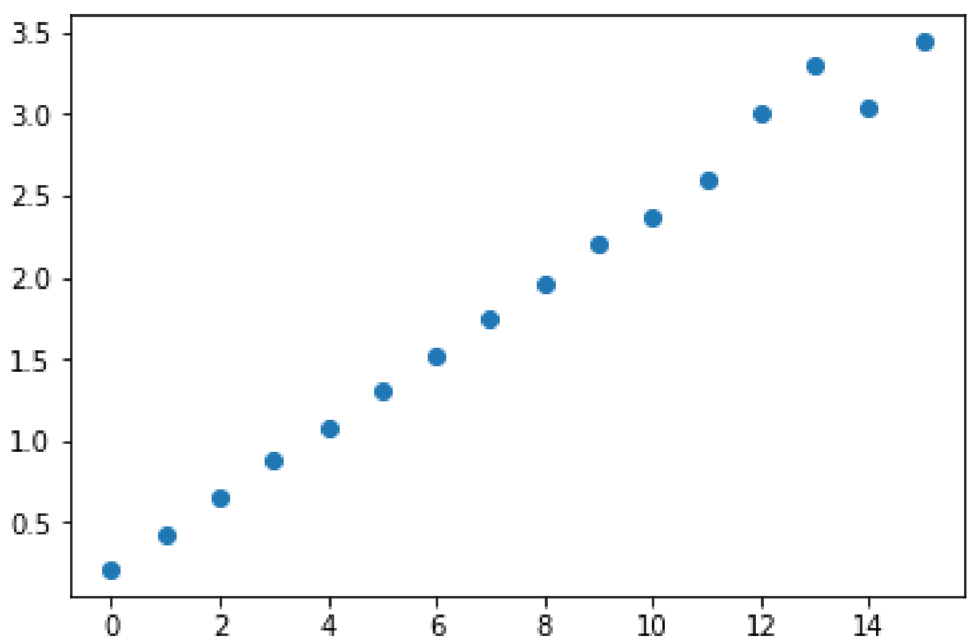
```
In [7]: nbr_photon,occurence = unique(data,return_counts=True)
        plot(nbr_photon,occurence,'o')
```

```
Out[7]: [<matplotlib.lines.Line2D at 0x7f8e6b24f128>]
```




```
In [8]: plot(occurence[:-1]/occurence[1:], 'o')
```

```
Out[8]: [<matplotlib.lines.Line2D at 0x7f8e6b02ca20>]
```



In [9]:
```
N = len(data)
data_2 = data.reshape((N//2, 2)).sum(axis=1)
```

In [10]:
```
print(data.mean())
print(data_2.mean())
```

```
4.594558
9.189116
```

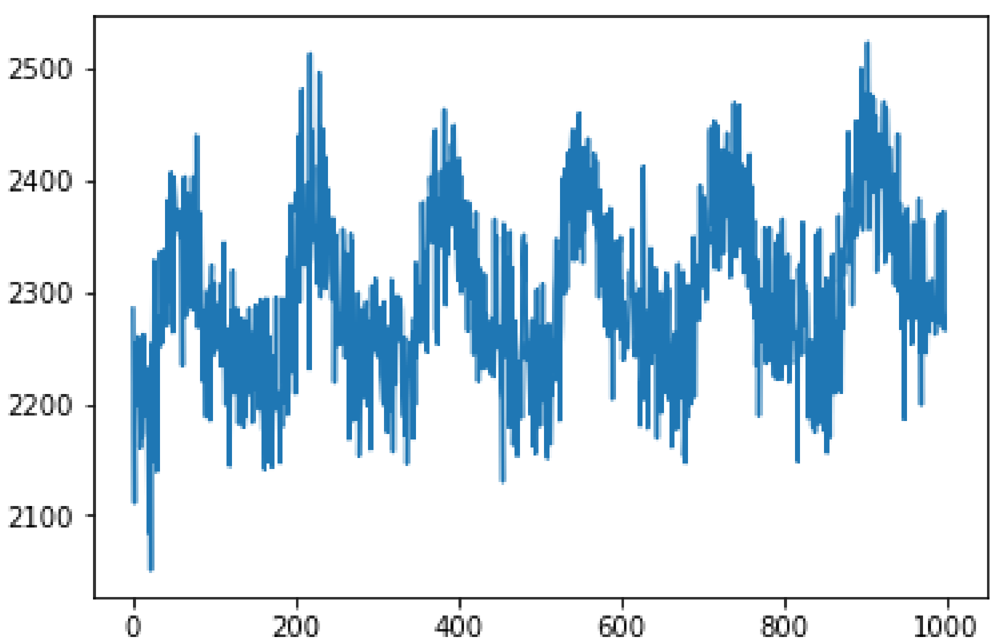
In [11]:
```
print(data.std()**2)
print(data_2.std()**2)
```

```
4.58009478464
9.11176713854
```

In [12]:
```
def moyenne_par_paquet(data, N):
    len_data = len(data)
    M = len_data//N
    return data[-(M*N):].reshape((M, N)).sum(axis=1)
```

In [13]:
```
plot(moyenne_par_paquet(data, 500))
```

Out[13]:
```
[<matplotlib.lines.Line2D at 0x7f8e6afedba8>]
```



In [ ]: