511-COMPL-compresion

December 3, 2017

In [1]:
```
%%cython

        cdef extern from 'gsl/gsl_rng.h':
           ctypedef struct gsl_rng_type:
              pass
           ctypedef struct gsl_rng:
               pass
           gsl_rng_type *gsl_rng_mt19937
           gsl_rng *gsl_rng_alloc(gsl_rng_type * T)

        cdef gsl_rng *r = gsl_rng_alloc(gsl_rng_mt19937)

        cdef extern from 'gsl/gsl_randist.h':
             long int uniform 'gsl_rng_uniform_int'(gsl_rng * r, unsigned long int n)

        def bit_aleatorio():
            cdef int n
            n = uniform(r,2)
            return n
```

In [2]:
```
print [bit_aleatorio() for muda in range(10)]
```

```
[1, 0, 0, 1, 0, 0, 1, 1, 1, 1]
```

In [3]:
```
%time L=[bit_aleatorio() for _ in srange(1024*1024)]
```

```
CPU times: user 312 ms, sys: 36 ms, total: 348 ms
Wall time: 329 ms
```

In [4]:
```
from string import *

        def archivo(L):
            C = ''
            while L != []:
                C += (chr(int(join(map(str,L[:8]),sep=''),base=2)))
                L = L[8:]
```

```
            outfile = open("prueba-bits","wb") #Abrimos el archivo para escribir en el
            outfile.write(C)                   #Escribimos la cadena C al archivo
            outfile.close()                    #Cerramos el archivo
```

```
In [5]: %time archivo(L)
```

```
CPU times: user 4min 24s, sys: 204 ms, total: 4min 24s
Wall time: 4min 24s
```

```
In [6]: from string import *

        def archivo2(N,filename):
            outfile = open(filename,"wb")
            for muda in xrange(N):
                L = [bit_aleatorio() for _ in range(8)]
                C = (chr(int(join(map(str,L),sep=''),base=2)))
                outfile.write(C)
            outfile.close()
```

```
In [7]: %time archivo2(1024*1024//8,"prueba-bits-3")
```

```
CPU times: user 552 ms, sys: 0 ns, total: 552 ms
Wall time: 552 ms
```

```
In [8]: %time archivo2(2048*2048//8,"prueba-bits-4")
```

```
CPU times: user 2.19 s, sys: 4 ms, total: 2.2 s
Wall time: 2.2 s
```

0.1 Con distintas probabilidades

```
In [9]: %%cython

        cdef extern from 'gsl/gsl_rng.h':
           ctypedef struct gsl_rng_type:
              pass
           ctypedef struct gsl_rng:
               pass
           gsl_rng_type *gsl_rng_mt19937
           gsl_rng *gsl_rng_alloc(gsl_rng_type * T)

        cdef gsl_rng *r = gsl_rng_alloc(gsl_rng_mt19937)

        cdef extern from 'gsl/gsl_randist.h':
             double uniform 'gsl_rng_uniform'(gsl_rng * r)
```

```
        def dec_aleatorio():
            cdef double n
            n = uniform(r)
            return n
```

```
In [10]: print [dec_aleatorio() for muda in range(10)]
```

```
[0.999741748906672, 0.16290987539105117, 0.28261780529282987, 0.9472010820172727, 0.2316565427
```

```
In [11]: def dado_trucado(p):
             x = dec_aleatorio()
             #print x
             if x < p:
                 return 0
             else:
                 return 1
```

```
In [12]: from string import *
         #from os import *


         def archivo2p(N,p,filename):
             outfile = open(filename,"wb")
             for muda in xrange(N):
                 L = [dado_trucado(p) for _ in range(8)]
                 C = (chr(int(join(map(str,L),sep=''),base=2)))
                 outfile.write(C)
             outfile.close()
```

```
In [13]: def generar_archivos(n):
             L = []
             for j in range(0,n+1):
                 p = (j/n).n()
                 filename = "/home/rhg/Desktop/COMPRESION/prueba-bits"+'-'+str(p)
                 #print p
                 #os.chdir("/home/rhg/Desktop/COMPRESION/")
                 archivo2p(2048*2048//8,p,filename)
                 os.system("tar cvzf %s %s" %(filename+'.tar.gz',filename))
                 tam = os.lstat(filename+'.tar.gz').st_size
                 L.append((p,tam))
             return L
```

```
In [14]: %time L = generar_archivos(20);print L
```

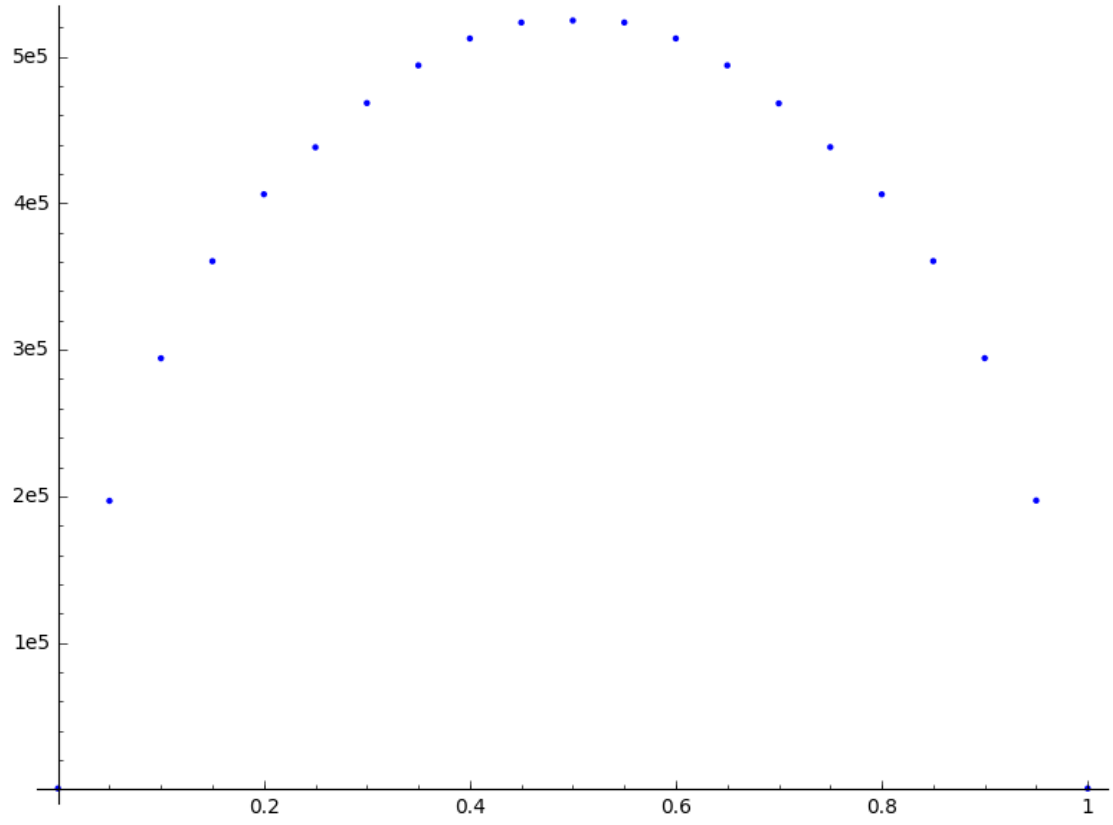
```
[(0.000000000000000, 671), (0.0500000000000000, 196920), (0.100000000000000, 294186), (0.15000
CPU times: user 2min 21s, sys: 160 ms, total: 2min 21s
Wall time: 2min 22s
```

In [15]:
```
2048*2048//8
```

Out[15]:
```
524288
```

In [16]:
```
points(L)
```

Out[16]:



In [17]:
```
var('a b c x'); model(x) = a*x^2+b*x+c
dicc = find_fit(L,model,solution_dict=True);print dicc
```

```
{b: 1871727.966979465, c: 80469.54222300767, a: -1871666.4863607015}
```

In [18]:
```
def solucion(x,dicc):
    return dicc[a]*x**2+dicc[b]*x+dicc[c]
```

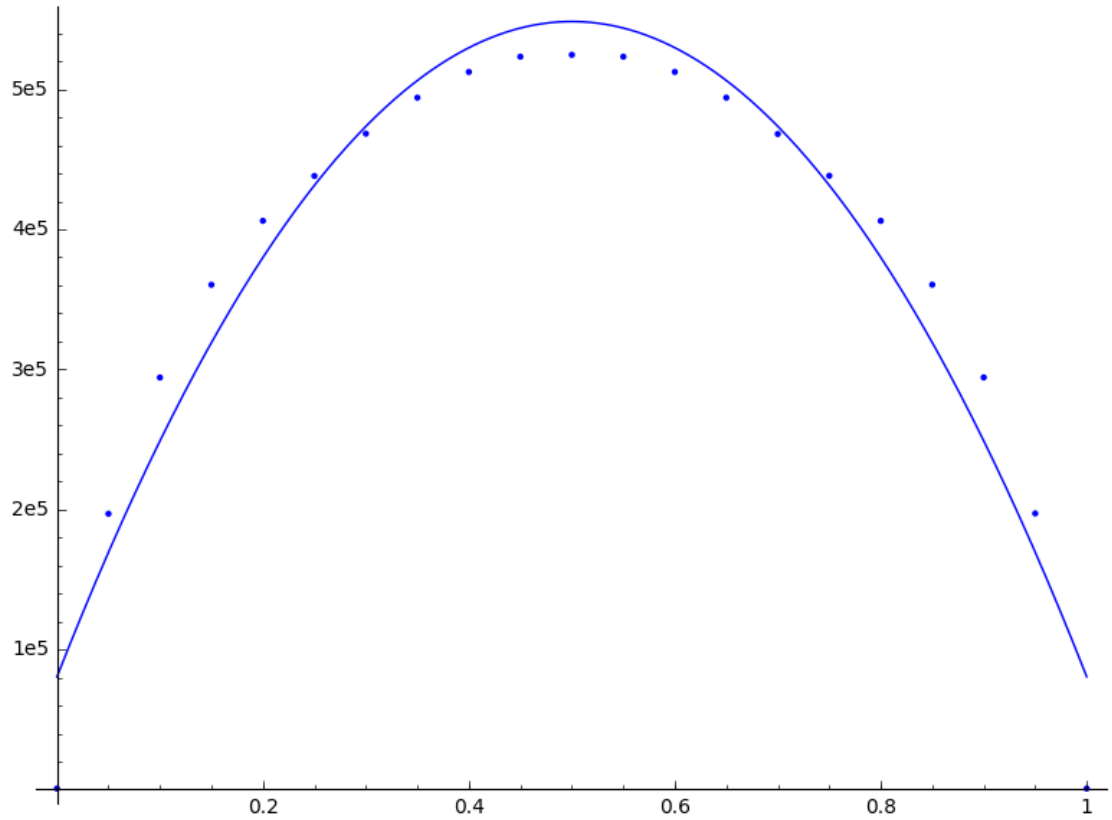
In [19]:
```
[(item[0],item[1]-solucion(item[0],dicc)) for item in L]
```

Out[19]:
```
[(0.000000000000000, -79798.5422230077),
 (0.0500000000000000, 27543.2256439208),
 (0.100000000000000, 45260.3259426529),
```

```
(0.150000000000000, 41307.7586731884),
(0.200000000000000, 26155.5238355274),
(0.250000000000000, 6715.62142966996),
(0.300000000000000, -5205.94854438398),
(0.350000000000000, -12262.1860866345),
(0.400000000000000, -17313.0911970814),
(0.450000000000000, -20453.6638757249),
(0.500000000000000, -23780.9041225648),
(0.550000000000000, -20444.8119376012),
(0.600000000000000, -17301.3873208341),
(0.650000000000000, -12286.6302722635),
(0.700000000000000, -5462.54079188954),
(0.750000000000000, 6798.88112028805),
(0.800000000000000, 26071.6354642697),
(0.850000000000000, 41331.7222400538),
(0.900000000000000, 45287.1414476421),
(0.950000000000000, 27702.8930870339),
(1.00000000000000, -79865.0228417711)]
```

In [20]:
```
points(L)+plot(dicc[a]*x**2+dicc[b]*x+dicc[c],x,0,1)
```

Out[20]:



In [ ]: