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Algorítmica – Práctica 1 – Ejercicio 1 - 2ºD

1.- Ordenación por Inserción:

- Código Fuente:

```
void Insercion(int a[], int n){
    for (int i = 1; i < n; ++i){
        int x = a[i];
        int j = i - 1;
        while (j >= 0 && x < a[j]){
            a[j + 1] = a[j];
            j = j - 1;
        }
        a[j + 1] = x;
    }
}
```

- Hardware:

Procesador: Intel® Core™ i5-3350P CPU @ 3.10GHz × 4
Memoria RAM: 8GB

- Sistema Operativo:

Ubuntu 14.04

- Compilador Utilizado:

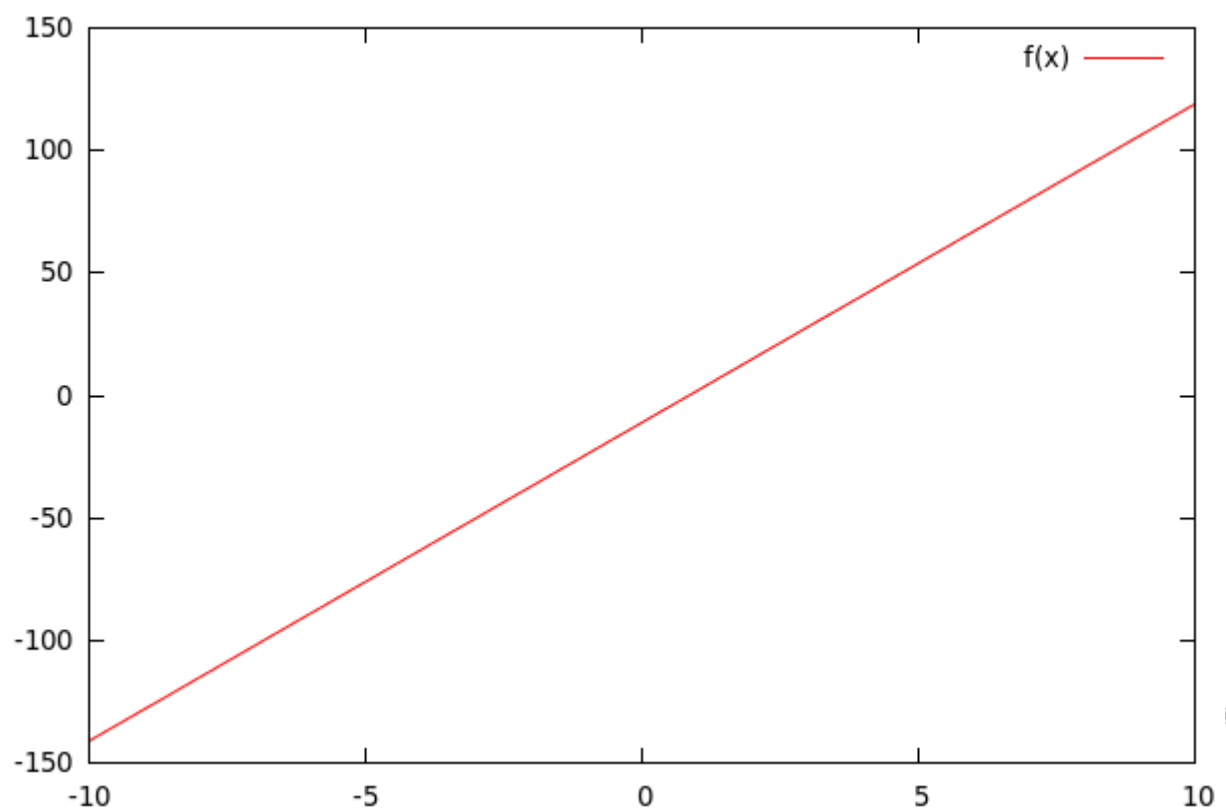
g++ -std=c++11

a) Caso Mejor:

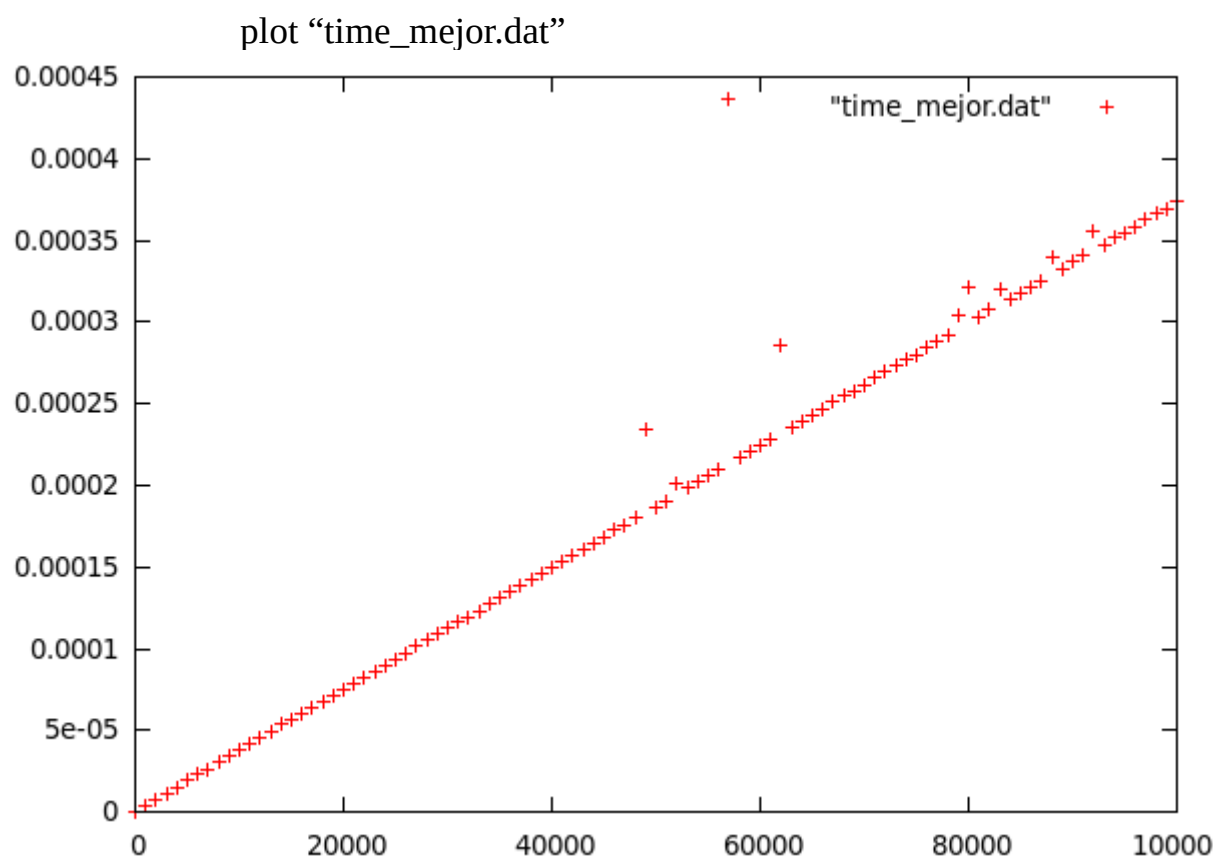
- Eficiencia Teórica:

$$\begin{aligned} T_m(n) &= 2 + \sum_{i=1}^{n-1} (2+2+4+3+2) \\ &= 13n - 11 \end{aligned}$$

$$\begin{aligned} f(x) &= 13x - 11 \\ \text{plot } f(x) \end{aligned}$$



- Eficiencia empírica:

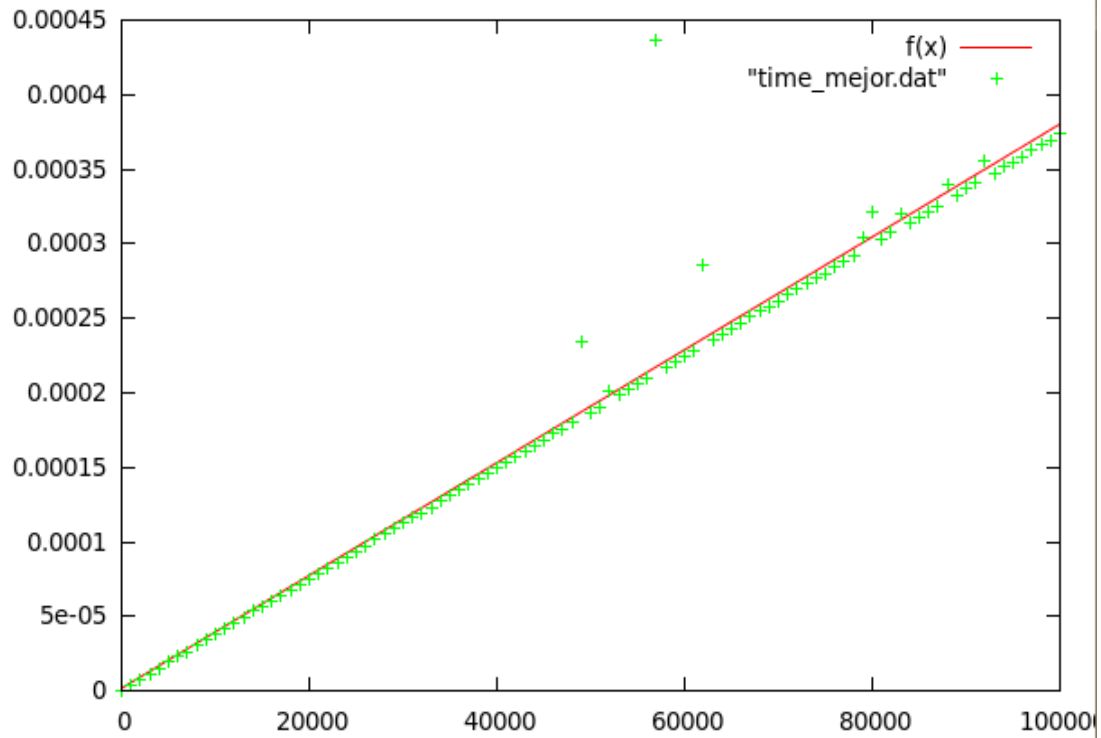


- Ajuste:

$$f(x) = a \cdot x - b$$

fit $f(x)$ "time_mejor.dat" via a, b

plot "time_mejor.dat", $f(x)$



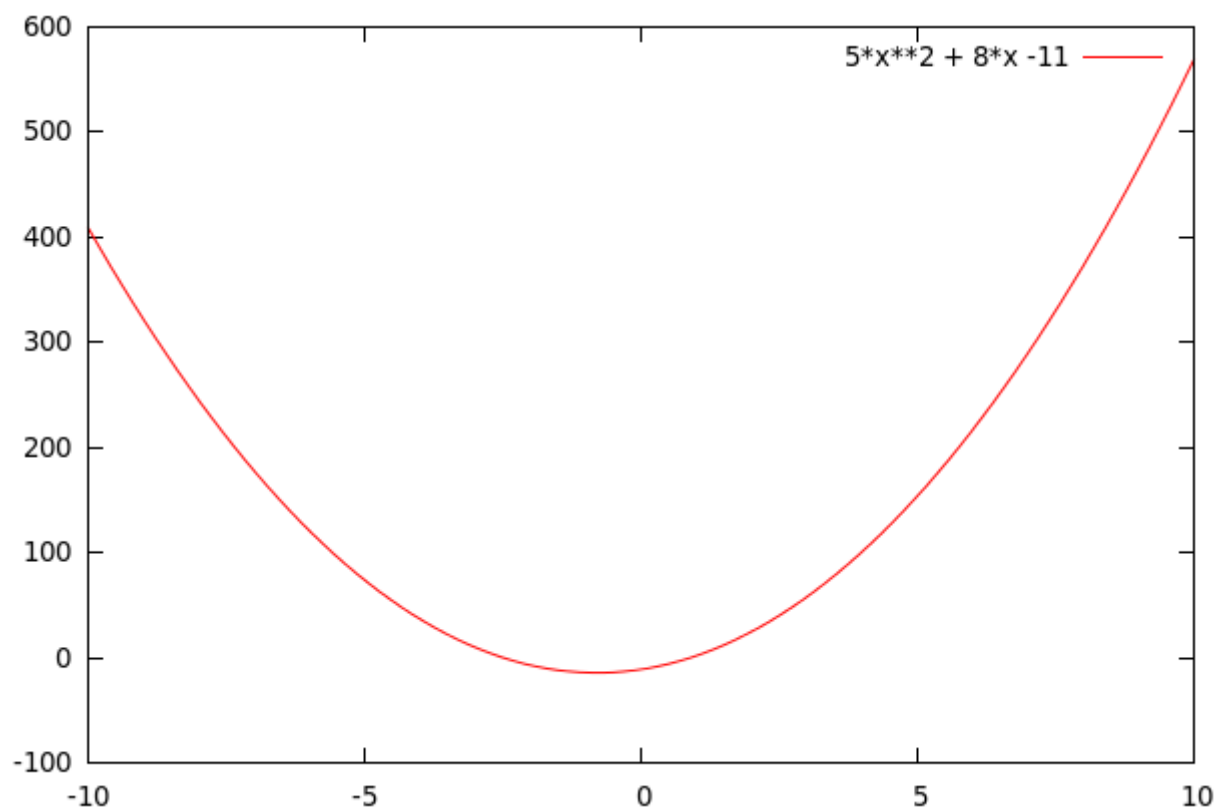
b) Caso Peor:

- Eficiencia Teórica:

$$T_p(n) = 2 + \sum_{i=1}^{n-1} (2+2+4+\sum_{j=0}^{i-1} (6+4)) + 3 + 2$$
$$= 5n^2 + 8n - 11$$

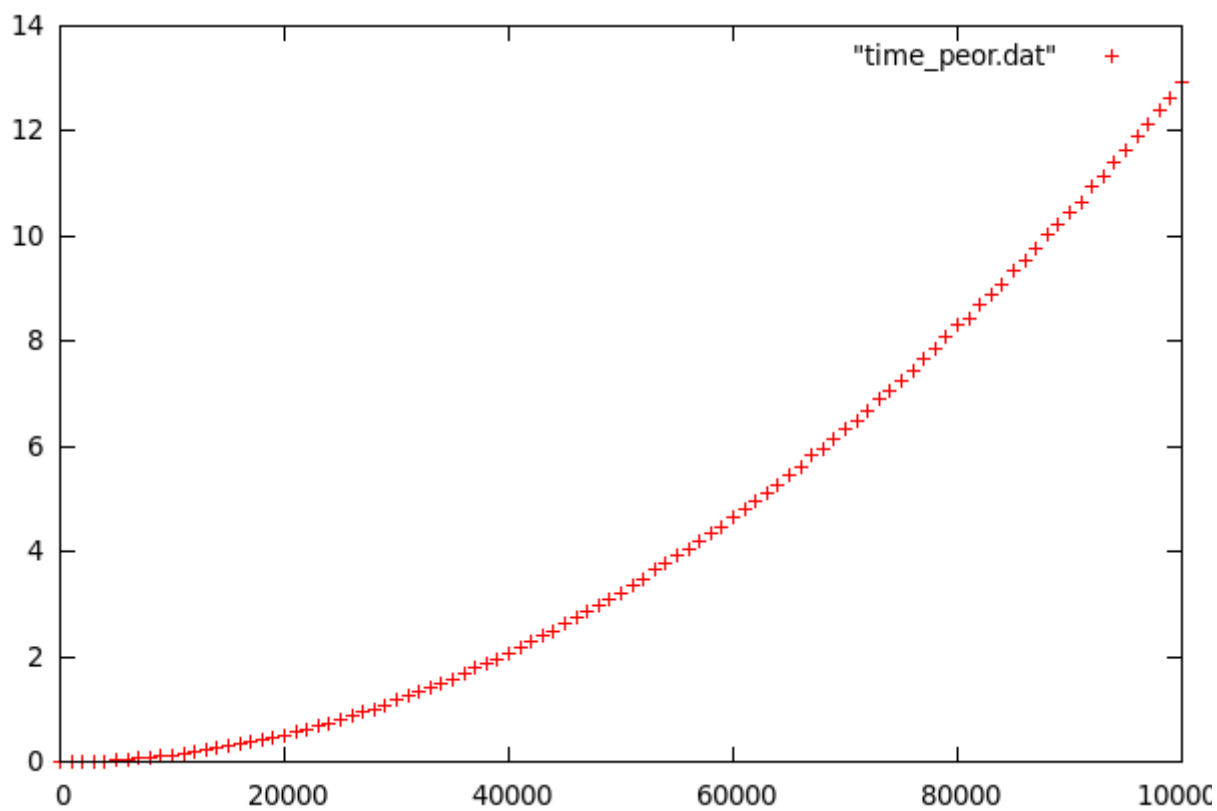
$$f(x) = 5 \cdot x^2 + 8 \cdot x - 11$$

plot $f(x)$



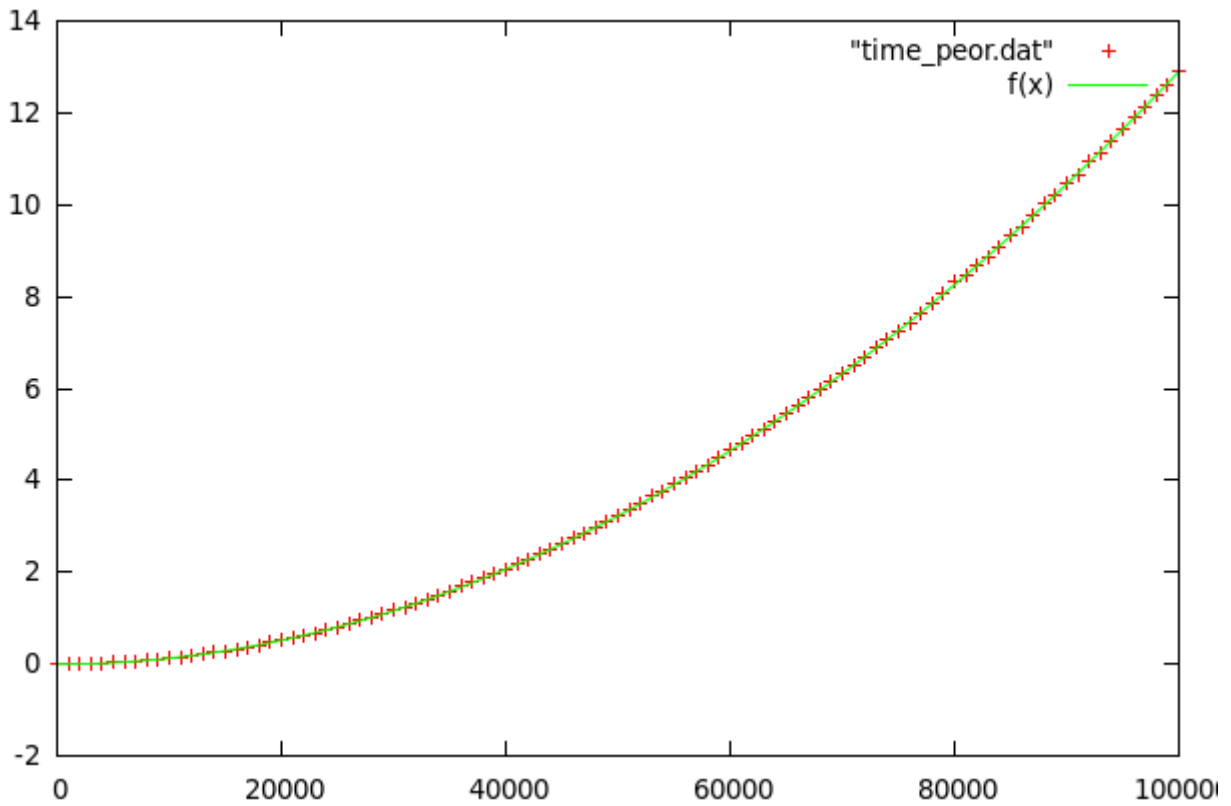
- Eficiencia empírica:

plot "time_peor.dat"



- Ajuste:

$f(x) = a*x**2 + b*x - c$
 fit $f(x)$ "time_peor.dat" via a, b, c
 plot "time_peor.dat", $f(x)$

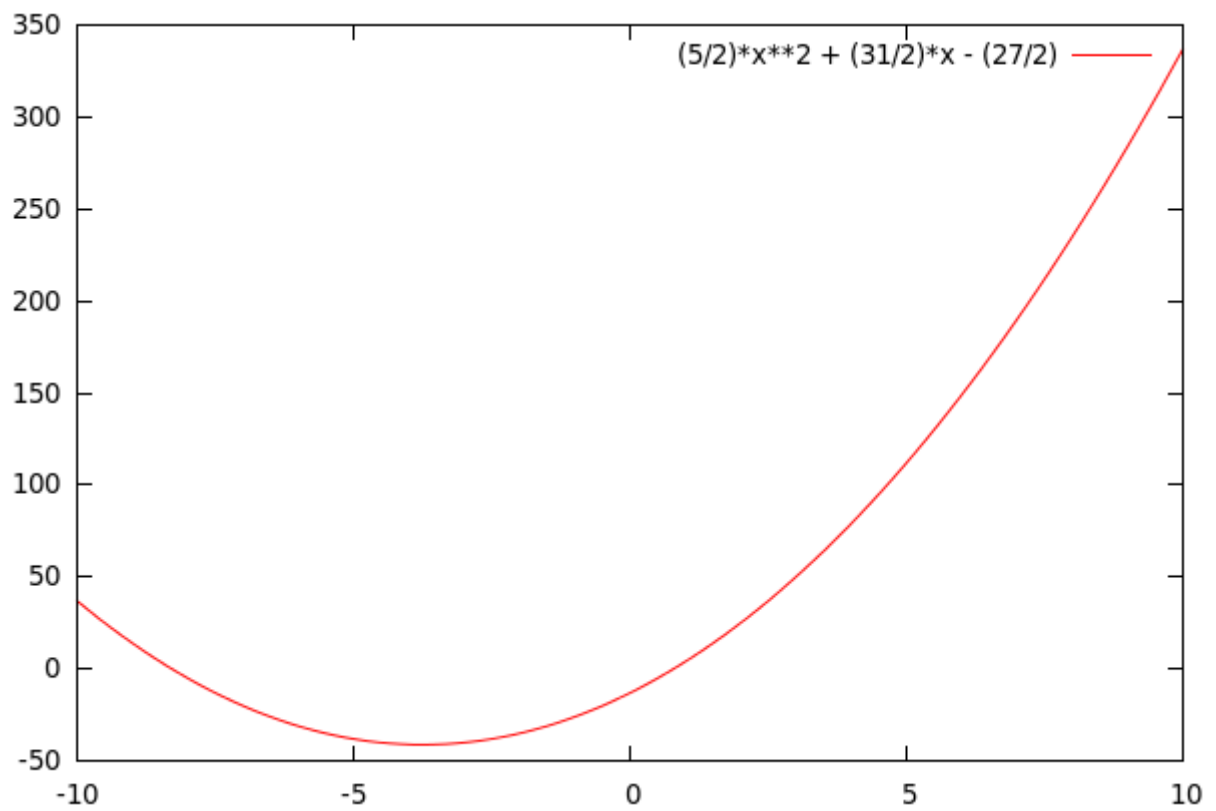


c) Caso Promedio:

- Eficiencia Teórica:

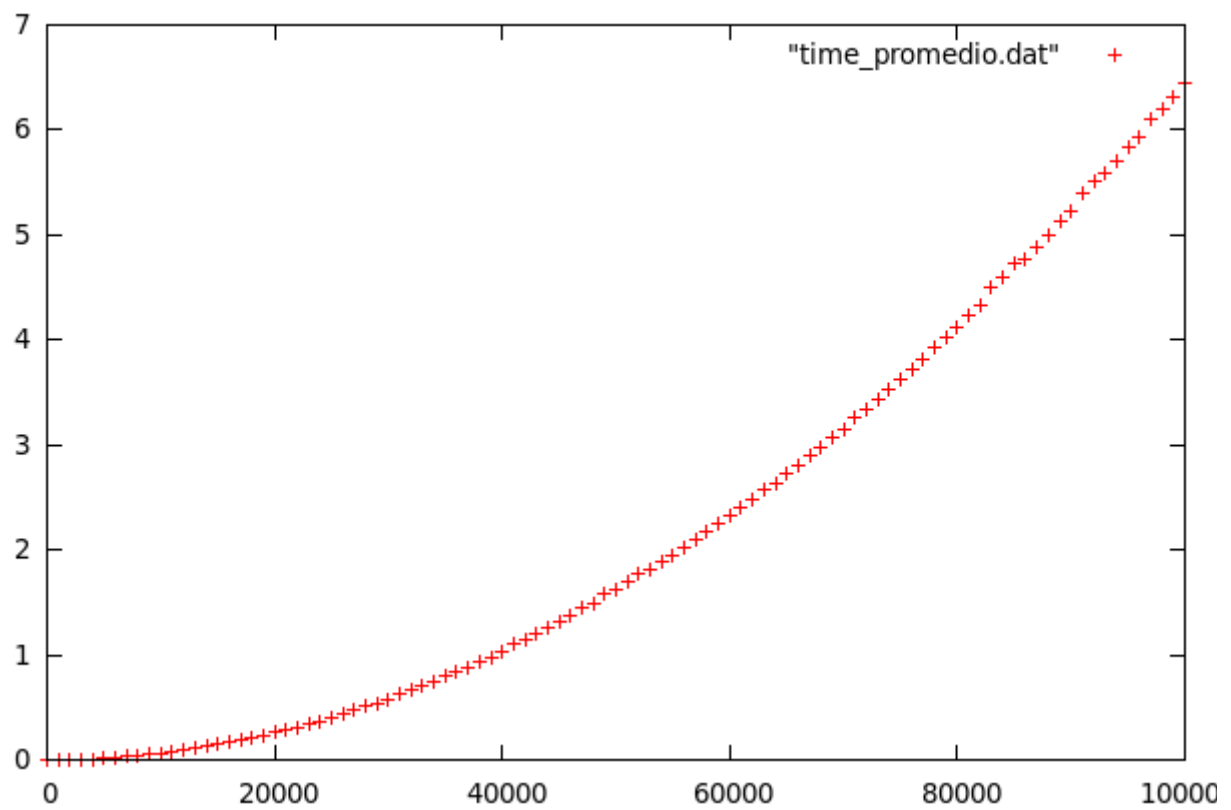
$$\begin{aligned}
 T_{1/2}(n) &= 2 + \sum_{i=1}^{n-1} (2+2 + \sum_{j=1}^{i-1} (4 + 2 + 1)) + 3 \\
 &= 5/2n^2 + 31/2n - 27/2
 \end{aligned}$$

$$\begin{aligned}
 f(x) &= (5/2)*x**2 + (31/2)*x - (27/2) \\
 \text{plot } f(x)
 \end{aligned}$$



- Eficiencia empírica:

plot "time_promedio.dat"



- Ajuste:

$$f(x) = a*x**2 + b*x - c$$

fit f(x) "time_promedio.dat" via a, b, c

plot "time_promedio.dat", f(x)

