

Lab 6 documentation

Problem statement

Polynomial multiplication in 4 ways, n squared and Karatsuba both in normal and parallel form.

Solution

N squared:

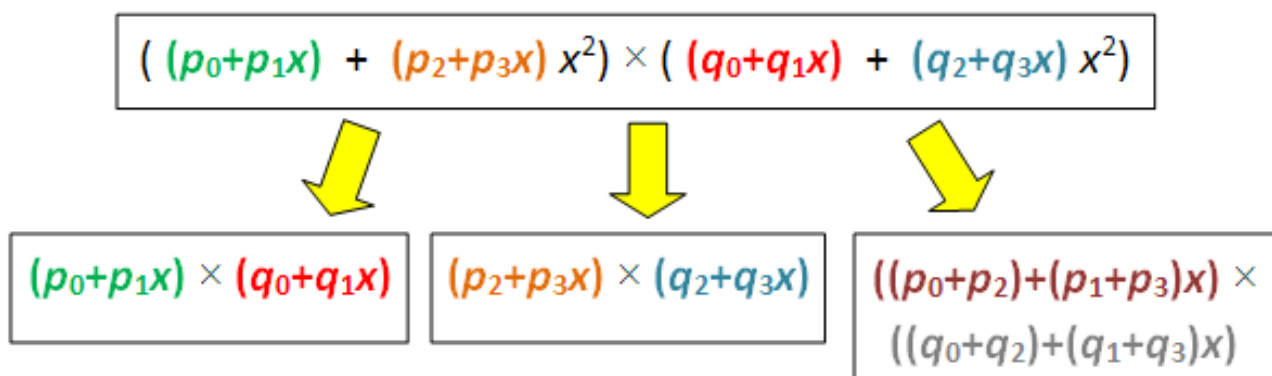
- simple n squared multiplication

Paralel N squared:

- a fixed number of threads
- Each thread receives an id
- Each thread computes result positions with modulo total length of the result equal to the id

Karatsuba:

- Karatsuba's algorithm is a formula that allows one to compute the product of two large numbers x and y using three multiplications of smaller numbers
- the algorithm splits the multiplication in 3 parts, it first computes the multiplication of the low part, the multiplication of the high part and the multiplication of the middle part



- It then computes result based on those

Karatsuba parallel:

- a fixed number of threads
- If we still have threads available, we can launch the computation of one of the three multiplications on a separate thread
- Apart from this, it is the same algorithm

Performance:

The parallel algorithms were measured for 8 threads.

N squared:

- 0m0.298s

Paralel N squared:

- 0m0.261s

Karatsuba:

- 0m3.296s

Parallel Karatsuba

- 0m1.074s