MPI lab DOCUMENTATION

**Regular polynomial multiplication**

* Complexity: O(n^2)
* Step 1: Distribute each term of the to every term of the second polynomial. Remember that when you multiply two terms together you must multiply the coefficient (numbers) and add the exponents
* Step 2: Combine like terms (if you can)

**Karatsuba algorithm**

* Complexity: O(n^log3)
* A fast multiplication algorithm that uses a divide and conquers approach to multiply two numbers

**OLD PERFORMANCE TABLE**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Polynomial degree | Simple sequential | Simple parallelized | Karatsuba sequential | Karatsuba parallelized |
| 10 | 1 ms | 20 ms | 1 ms | 15 ms |
| 100 | 5 ms | 22 ms | 21 ms | 18 ms |
| 1000 | 41 ms | 95 ms | 78 ms | 35 ms |
| 10.000 | 1223 ms | 536 ms | 890 ms | 300 ms |

**MPI TABLE**

|  |  |  |
| --- | --- | --- |
| Polynomial degree | Simple | Karatsuba |
| 10 | 3782 microseconds (3 ms) | 5346 microseconds (5 ms) |
| 100 | 4417 microseconds (4ms) | 8836 microseconds (8 ms) |