

# High Performance Matrix Computations

## Matrix Chain Product

### Report

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### Foreword

This short report is suppose to be a guideline for the exam

### Approach

Via Dynamic Programming I have to computed an optimal parenthesise for a matrix chain  $X := M_1 \cdot M_2 \dots M_n$ . Each matrix  $M_i$  has a random size in the range  $[10 \dots 100]$ . The optimal parenthesise is determined with different cost functions, which are the following:

1. Minimum Flops
2. Randomised costs
3. Minimum memory usage
4. Optimise cache usage
5. Optimised cost function for multiple cores

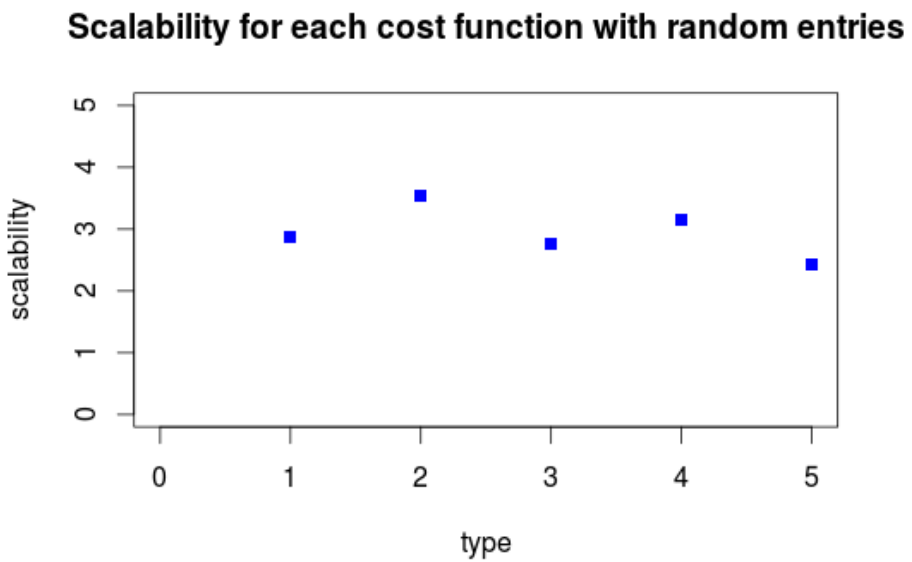
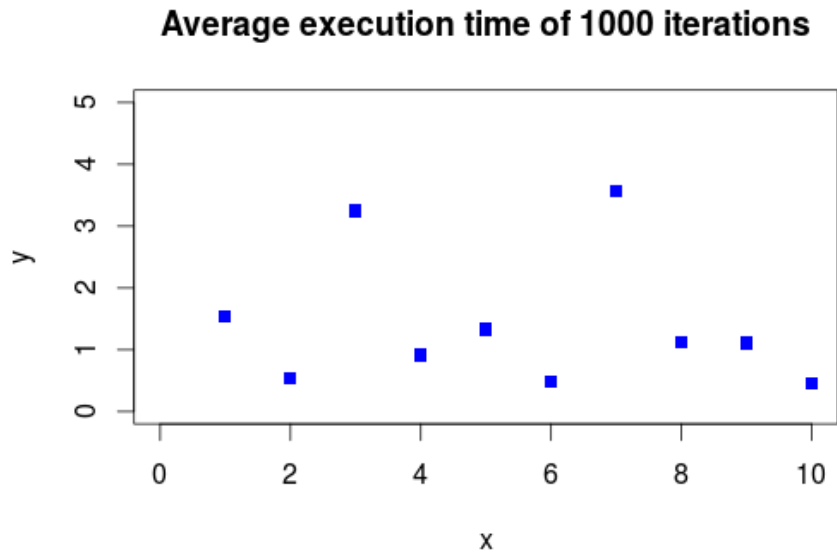
The following tests have been done:

1. 20 random sized matrices with each cost function in sequential and parallel (4 cores)
2. Specific sized matrices that present noticeable results

## Test results

### Random sized matrices

For  $x=i$  is the sequential execution time and  $x=i+1$  is parallel execution time for cost function  $i$



### **Specific matrices**

Will be provided. Some examples can be seen in the randomResults. The properties will be analysed.