Programmeren (FEB22012)

4. Exercise

Deadline for submission: 2011-09-18 23:59 CET

Instructions

In the third lecture you were shown different algorithms for matrix multiplication. In this week's first exercise you will implement them and compare the running times similarly as you did in the 3rd exercise for different sorting algorithms.

Exercise

Implement as Matlab functions the following two matrix multiplication algorithms, both of them taking as parameters matrices A and B and returning $C = AB$.

1. Naive "schoolbook" algorithm
2. Strassen's algorithm

Make a script file for assessing the running times of the two multiplication algorithms in multiplying matrices of sizes $n \times n$, where $n \in \{2, 3, \ldots, 100\}$. In each iteration of the computational test, construct the matrices (A and B) to be multiplied to contain random integers from the interval (1, 10). Plot *differences* of the running times of the two algorithms for each size of the matrix so, that x-axis is n and y-axis $T_{naive}(n) - T_{strassen}(n)$. Remember to include axis titles and legend in the graph. How large does n have to be for the Strassen's algorithm to be faster? Plot a vertical line indicating this value n_0.