

Matrix Multiplication

Method: Modified Divide and Conquer (Strassen's Subcubic Matrix)

Input: Two matrices A(nm) and B(mk)

Output: Matrix C(nk) = A.B

Steps:

1. divide A and B into 4 matrices (each) and compute **Seven** products (recursively)
2. add and subtract the pairs as following:

$$\begin{bmatrix} a & b \\ c & d \end{bmatrix} \times \begin{bmatrix} e & f \\ g & h \end{bmatrix} = \begin{bmatrix} p5 + p4 - p2 + p6 & p1 + p2 \\ p3 + p4 & p1 + p5 - p3 - p7 \end{bmatrix}$$

A B C

Run time: $O(N^2)$

Implementation: The matrix multiplication via two methods: Divide&Conquer $O(N^3)$, and modified Divide & Conquer (Strassen'ssubcubic Martix) $O(N^2)$ (Python v.3).