▶ Setting

The goal of this project is to gain a better understanding of the tensor rank.

▶ Tasks

1. Read [Ten Berge. Kruskal's polynomial for $2 \times 2 \times 2$ arrays and a generalization to $2 \times n \times n$ arrays. 1991] and use this technique to prove that the tensors on Slides 9 and Slides 11 (tensor $\mathcal{X}$) of Lecture 5 have tensor rank larger than 2.
2. Implement the ALS method for approximating a tensor in CP decomposition. Apply it to the Strassen tensor $\mathcal{T}_2$ with tensor rank 7. Choose the initial values by taking the explicit CP decomposition from Slide 15 and peturb each factor by a random matrix of norm $\varepsilon > 0$. How far can you choose ε such that the ALS method reliably converges to the global minimum.