Assignment 2: Prove the convergence of k-means#

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1 Problem

In the recent k-means variant algorithm k-means# [1], the iteration procedure aims to maximize the following objective function

$$I = \sum_{r=1}^{k} \frac{D_r^T D_r}{n_r}, \tag{1}$$

where $D_r = \sum_i x_i, x_i \in S_r$ is the composite vector of cluster S_r, and n_r is the size of cluster S_r. Please prove that the iteration procedure converges.

2 Requirements

- Please organize your proof as a report in English. Indicate your student number in the report and the student name and student number in the email;
- The report should be in PDF format;
- The deadline is 2024-Oct.-31, 12:00pm.
- Email: stonescx@gmail.com

References

[1] W.-L. Zhao, C.-H. Deng, C.-W. Ngo, "k-means: a revisit," *Neurocomputing*, vol. 291, pp. 195–206, 2018.