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Perron-Frobenius theory and max-plus algebra on tensors

Abstract

One of the new methods of data recovery is the tensor completion problem. Since most of the data such as photos and videos and numerical data are in the form of tensors, tensor completion methods for information recovery are of great importance and attractiveness in this field. The purpose of low-rank tensor completion is to recover lost information so that the tensor rank is minimized. So far, various methods have been proposed to solve the problem of tensor completion, among which methods based on the nuclear norm are of particular importance due to their convexity. However, methods based on nuclear norm have a high computational complexity, since the calculation of the singular value decomposition in each iteration of the algorithm is needed. For this reason, in order to reduce the computational cost and increase the convergence speed of the answer, we use the fast tri-factorization method of matrix completion. In this work, we generalize the fast tri-factorization method of matrix completion to the tensor case.