World Academy of Science, Engineering and Technology
International Journal of Mathematical and Computational Sciences
Vol:16, No:05, 2022

Matrix Completion with Heterogeneous Cost

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Abstract : The matrix completion problem has been studied broadly under many underlying conditions. The problem has been explored under adaptive or non-adaptive, exact or estimation, single-phase or multi-phase, and many other categories. In most of these cases, the observation cost of each entry is uniform and has the same cost across the columns. However, in many real-life scenarios, we could expect elements from distinct columns or distinct positions to have a different cost. In this paper, we explore this generalization under adaptive conditions. We approach the problem under two different cost models. The first one is that entries from different columns have different observation costs, but within the same column, each entry has a uniform cost. The second one is any two entry has different observation cost, despite being the same or different columns. We provide complexity analysis of our algorithms and provide tightness guarantees.

Keywords : matroid optimization, matrix completion, linear algebra, algorithms
Conference Title : ICCOA 2022 : International Conference on Combinatorial Optimization and Applications
Conference Location : Barcelona, Spain
Conference Dates : May 26-27, 2022