

BERNOULLIS TAFELRUNDE

GRADUATE STUDENT SEMINAR

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Seminarraum 00.003, Spiegelgasse 1

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Pseudotrees and Not Getting Slapped Too Often

ABSTRACT

Given an undirected graph with n vertices and m edges, our aim is to find an orientation of the graph such that the maximum indegree is as small as possible. Westermann's algorithm solves this problem by exploiting the matroid structure of pseudoforests. We introduce a novel technique that uses approximation algorithms to speed up a binary search in an exact algorithm, such as Westermann's. The runtime we obtain for the orientation problem is $\mathcal{O}(m^{1.5} \sqrt{\log \log n})$. Our experimental results show that the problem can be solved on large real-world networks in reasonable time, and preprocessing increases performance significantly. The results may be interesting for applications because the problem has a strong connection to the densest subgraph problem.