ALPEN-ADRIA UNIVERSITÄT KLAGENFURT

Invitation to a Guest Lecture

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"On the complexity of the bilevel minimum spanning tree problem"

Z.1.09 | Thursday, 25 August 2022 | 10:00 a.m.

Abstract

We consider the bilevel minimum spanning tree (BMST) problem where two decision makers, the leader and the follower, each controlling a subset of the edges of a graph, jointly choose a spanning tree. Each decision maker has their own cost function on the edges and minimizes the sum of these costs over the chosen spanning tree. Although BMST is a combinatorial bilevel optimization problem that is easily defined, its computational complexity was an open question stated recently by Shi et al. In this talk, we will answer this question by showing that BMST is NP-hard in general. Moreover, by relating BMST to vertex-disjoint Steiner trees problems, we give some evidence that the problem might even remain hard in case the follower controls only few edges.

We finally consider variants of BMST where one or both of the two decision makers have a bottleneck instead of a sum objective function. We settle the complexity landscape of all combinations of sum or bottleneck objectives for the leader and the follower, in the optimistic as well as the pessimistic

setting.
This is joint work with Christoph Buchheim and Felix Hommelsheim.

Angelika Wiegele and the Department of Mathematics look forward to seeing you at the talk!