Institut für Diskrete Mathematik

Seminar für Kombinatorik und Optimierung

15.2.2021, 10:00 (on time)

Webex virtual meeting

On the complexity of the bilevel minimum spanning tree problem

Dorothee Henke

(University of Dortmund)

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 and that it remains hard even in special cases such as the one where the follower only controls a tree. 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.

(Joint work with Christoph Buchheim and Felix Hommelsheim)

Meeting will be started at 9:30 a.m. for an informal chat. Talk starts at 10:00 a.m.

https://tugraz.webex.com/tugraz/j.php?MTID=mb8dc363b285c3204089ce6b0d281f2ae

Meeting number (access code): 121 483 8939, password: 3gpMuWCm3q3

Eranda Dragoti-Çela and Bettina Klinz