INVITATION TO A
GUEST LECTURE

Dorothee Henke, M.Sc.
TU Dortmund

“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!