

Abstract:

The Multicommodity Flow Network (MFN) relaxation, developed in [An, Singh, Svensson, FOCS~2014], is the only polynomial-time solvable relaxation that is known to provide a bounded integrality gap for the classic capacitated facility location (CFL) problem. The best upper-bound known for the integrality gap of this strong LP relaxation, however, is in the order of 288.

In this talk, I will share the research result I published in SODA 2023 regarding the integrality gap of MFN relaxation for the CFL problem and also some further advances for this problem. In particular, In the referred research work, we show that the MFN relaxation has an integrality gap at most $\left(10+\sqrt{67}\right)/2 \approx 9.0927$ for the CFL problem. This narrows down the range of the integrality gap to one digit, and the ingredient is an iterative rounding algorithm for this sophisticated LP relaxation.