

Uncrossing Partitions

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Abstract

We extend a well known *uncrossing* technique in linear programs (LPs) to work with partitions. Using this technique, we tie together three previously unrelated papers on Steiner trees, by showing that the following three values are equal: (1) the objective value of a subtour based LP by Polzin and Vahdati Daneshmand; (2) the objective value of a partition based LP by Könemann and Tan; (3) a “maximum gainless tree” quantity used by Karpinski and Zelikovsky. These LPs are known to be stronger than the *bidirected cut relaxation*; we conjecture that in *preprocessed* graphs, these LPs are exactly as strong as the bidirected cut relaxation, which would add a surprising fourth item to our list.