Project: Cutting the Graph Cheaply

December 20, 2019

Suppose that a network $G = (V, E)$, where each edge $e \in E$ is associated with a cost $c(e)$ is given. The (generic) cut problem asks to remove a subset of edges so as to break the graph into two (or more) pieces, with the objective of minimising the total cost of edges removed. Two classical examples are the *s-t-cut* and the *global min-cut*. In the former, we want to make sure two given terminals s and t are separated; in the latter, we just want to make sure the graph becomes disconnected. Due to their fundamental theoretical interest and numerous applications, these cut problems are among the most studied problems in computer science and operation research.

In this project, we will look into several interesting new invariants of the cut problem and try to design new exact/approximation algorithms for them.

No prior knowledge (except mathematical maturity) will be required for the people interested in this project.

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