Institute of Theoretical Computer Science
Parallel Computing Group
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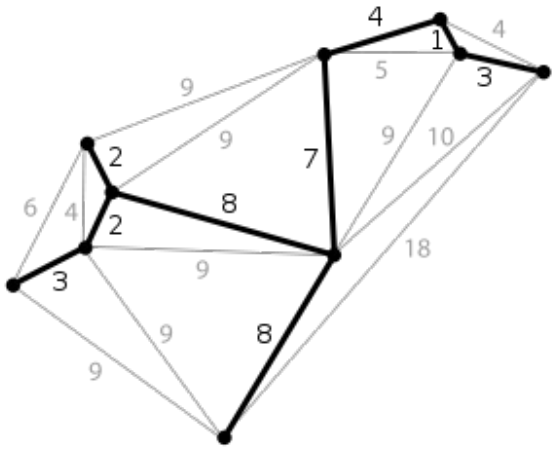
Bachelor's/Master's Thesis
Low-stretch Spanning Trees

Description. Spanning trees of graphs are a fundamental concept in algorithmics. In a connected graph G, each spanning tree of G can be seen as a "backbone" of G that ensures connectedness. Within the vast area of graph algorithms, spanning trees have many applications – and these applications may require different classes of spanning trees. One such class is comprised of so-called *low-stretch spanning trees*. Roughly speaking, if one reduces a graph to a low-stretch spanning tree, the detour one has to make to reach a vertex v from some source vertex s via tree edges only is guaranteed to be small. This has not only applications in shortest paths but also in many other areas such as linear systems and network centrality measures.

Tasks. In the course of your thesis you are going to perform a thorough literature search on low-stretch spanning trees and algorithms computing them. Then, on the basis of this search and your categorization of existing methods, you will implement different approaches and compare their performance in practice.



Requirements. Required is at least basic knowledge on and a high interest in algorithms and graphs, as taught in computer science courses at the Bachelor level. You should also have solid programming skills – experience with C++ and/or Python is an advantage. This topic can be worked on as a Bachelor's or Master's thesis. The amount of work and its scientific depth will be adjusted to the thesis type.

Benefits. When working on this thesis, you have the chance to participate in a current research project performed in collaboration with US colleagues.

Contact. *Please do not hesitate to contact us via e-mail or face-to-face if you are interested.*

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