## New algorithms for Steiner tree reoptimization

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## 7 — Abstract -

- $_{\circ}$  Reoptimization is a setting in which we are given an (near) optimal solution of a problem instance
- <sup>9</sup> and a local modification that slightly changes the instance. The main goal is that of finding an <sup>10</sup> (near) optimal solution of the modified instance.
- We investigate one of the most studied scenarios in reoptimization known as Steiner tree 11 12 reoptimization. Steiner tree reoptimization is a collection of strongly NP-hard optimization problems that are defined on top of the classical Steiner tree problem and for which several constant-13 factor approximation algorithms have been designed in the last decade. In this paper we improve 14 upon all these results by developing a novel technique that allows us to design *polynomial-time* 15 approximation schemes. Remarkably, prior to this paper, no approximation algorithm better 16 than recomputing a solution from scratch was known for the elusive scenario in which the cost 17 of a single edge decreases. Our results are best possible since none of the problems addressed in 18 this paper admits a fully polynomial-time approximation scheme, unless P = NP. 19
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