

Improving the Efficiency of Algorithms for Survivable Multi-layer Network Design

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Abstract: Modern telecommunication networks consist of a complex stack of subnetworks (layers) that are based on different technologies and are strongly interdependent. The *survivable multi-layer network design problem* (SND) consists in installing capacities on the elements of each layer to route user traffic in a normal state and also when a subset of network elements fails.

The integrated design of a survivable multi-layer network is a very challenging task and the size of optimally designable networks is known to not exceed fifteen nodes. As a consequence, the traditional design approach breaks the SND into a set of single-layer problems that are sequentially solved. Such approach makes the problem more tractable, but, on the other hand, neglects the strong interdependencies between layers and may lead to arbitrarily bad solutions.

In this work, we present a new algorithm that improves the capacity of solving the SND in an integrated way by a better exploitation of the available computational resources. The work is developed as part of *ROBUKOM*, a German research project that focuses attention on the design of robust multi-layer networks. The effectiveness of our algorithm is assessed through a wide computational experience conducted on real network instances provided by our industrial partners in ROBUKOM.

References

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