
Energy-aware survivable network management with shared protection

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Résumé

This work focuses on the problem of managing an energy aware resilient network. A network and a set of available links are given. A set of demands have to be routed and must be protected against single edge failure. Share protection mechanism is considered: for each demand, a primary and a edge-disjoint backup path are provided. Backup paths are used only when a failure occurs. As failures are quickly restored, edges used only by backup paths are active for short periods. Energy consumption is due only to edges used by primary paths, but both primary and backup path contribute to link capacity consumption. The problems asks to route all the demands with the aim of minimizing the overall link device energy consumption.

We model the problem with two formulations: a formulation including primary and backup routing variables, and a projected formulation including only primary paths, and we propose valid inequalities for both.

We compare three solution strategies: complete formulation solved by CPLEX used as stand-alone solver, complete formulation and projected formulation, both with cut generation. We tested the strategies on two sets of instances. Results show that the projected formulation outperforms the others on both sets of instances.

Mots-Clés: green networking, shared protection, branch and cut

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