ALPEN-ADRIA UNIVERSITÄT KLAGENFURT

INVITATION TO THE DOCTORAL SEMINAR

SDP-based bounds for the Quadratic Cycle Cover Problem via cutting plane augmented Lagrangian methods and reinforcement learning

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Chaired by Angelika Wiegele | Department of Mathematics

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classroom.aau.at/math-stat

ABSTRACT

We study the Quadratic Cycle Cover Problem (QCCP), which aims to find a node-disjoint cycle cover in a directed graph with minimum interaction cost between successive arcs. We derive several semidefinite programming (SDP) relaxations and use facial reduction to make these strictly feasible. To solve our relaxations, we propose an algorithm that incorporates an augmented Lagrangian method into a cutting plane framework by utilizing Dykstra's projection algorithm. Our algorithm is suitable for solving SDP relaxations with a large number of cutting planes. Computational results show that our SDP bounds and our efficient cutting plane algorithm outperform other QCCP bounding approaches from the literature. Finally, we provide a new SDP-based upper bounding technique, which is a sequential Q-learning method that exploits a solution of our SDP relaxation within a reinforcement learning environment.

We hope to see you there!