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Exact and Approximate Schemes for Robust Optimization Problems with Decision-Dependent Information Discovery

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In uncertain optimization problems with decision-dependent information discovery, the decision-maker can influence when information is revealed, unlike the classic setting where uncertain parameters are revealed according to a prescribed filtration. This work examines two-stage robust optimization problems with decision-dependent information discovery, focusing on uncertainty in the objective function. We introduce the first exact algorithm for this class of problems and enhance the existing K-adaptability approximation by strengthening its formulation. Our approaches are tested on robust orienteering and shortest-path problems. We study the interplay between information and adaptability, demonstrating that the exact solution method often outperforms the K-adaptability approximation. Moreover, our experiments highlight the benefits of the strengthened K-adaptability formulation over the classical one, even in settings with decision-independent information discovery.

Author: PARADISO, Rosario (Vrije Universiteit Amsterdam)

Co-auteurs: GEORGHIOU, Angelos (University of Cyprus); Dr TÖNISSEN, Denise; Dr DABIA, Said (Vrije Universiteit Amsterdam)

Orateur: PARADISO, Rosario (Vrije Universiteit Amsterdam)

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