Computing enclosures for multiobjective mixed-integer nonconvex optimization problems with application to energy supply networks

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Abstract

In many real-world applications one seeks to optimize more than one objective function. If these objectives are conflicting, some variables are required to take only integer values and no convexity assumptions are made, one obtains so-called multiobjective mixed-integer nonconvex optimization problems. In this talk, we present a novel approach for computing an enclosure of the nondominated set of such problems. Our criterion space method avoids solving any MINLPs by using relaxations of the original problem which are refined during the procedure only when necessary. Furthermore, it is guaranteed that the enclosure satisfies a certain quality criterion up to a pre-scribed accuracy. The application to instances of decentralized energy supply networks demonstrates the effectiveness of this approach when dealing with larger optimization problems.

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