Linear Relaxations in Global Optimization: Combine and Compare Reformulation Methods, Gradient-based Method and Affine Arithmetic.

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Abstract:

In a Branch-and-Bound Algorithm based on Interval Analysis, the linear relaxations have proved their interest and efficiency. Three distinct approaches are used: the Reformulation-Linearization-Techniques, the first-order Taylor expansion, and the Affine Arithmetic. These methods are philosophically different and develop by distinct communities. Nevertheless, Contractor Programming is a methodology which allows to enclose each algorithm in a unify framework in order to interact with each other. Using this approach, we show in this presentation that these three relaxation techniques can be combined and compared.