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GEMEINSAMES

KOLLOQUIUM
"OPTIMIERUNG UND OPERATIONS RESEARCH"

DER WIRTSCHAFTS- UND SOZIALWISSENSCHAFTLICHEN FAKULTÄT,
DER FAKULTÄT FÜR INFORMATIK UND DER FAKULTÄT FÜR MATHEMATIK

Im Rahmen des Kolloquiums spricht

Herr Dr. Dennis Michaels,
ETH Zürich,

zum Thema

Improved convex relaxations through simultaneous convexification of non-linear functions

Der Vortrag findet statt am

Montag, 16. Juli 2012, 16:00 Uhr

im Seminarraum M/E19, Mathematikgebäude, Erdgeschoss.

Interessierte Hörerinnen und Hörer sind herzlich willkommen!

Der Vortrag richtet sich auch an Studierende der Mathematik, der Wirtschaftsmathematik und der Informatik mit Vorkenntnissen in Optimierung und/oder Operations Research.

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Zusammenfassung:
A challenging task in global optimization is to construct tight convex relaxations that provide reasonably globally valid bounds on a mixed-integer nonlinear program (MINLP). For a general MINLP, convex relaxations are usually obtained by replacing each non-linearity by convex under- and concave overestimators. The mathematical object studied to derive such estimators is given by the convex hull of the graph of the function over the relevant domain.
To derive improved relaxations, we consider a finite set of given functions as a vector-valued function and study the convex hull of its graph. We establish a link between such a convex hull object and the convex hulls of the graphs of a certain family of real-valued functions. This link can be used to define improved relaxations. We especially focus on small sets of well-structured univariate functions. Moreover, we consider some classes of (real-valued) functions for which a simultaneous convexification with the set of multi-linear monomials leads to an explicit description for the tightest convex underestimating function. The extended formulation is based on the idea of the RLT-approach introduced by Sherali and Adams.
Numerical examples are presented demonstrating the impact of the concepts.

(joint work with Martin Ballerstein and Robert Weismantel)