Exact and Heuristic MIP Methods for the Solution of MINLP with Examples from Gas Transport Optimization Problems

R. Burlacu[1], **B. Geißler**[2], **A. Morsi**[3], <u>**L. Schewe**</u>[4], **and M. Schmidt**[5]

Abstract: In this talk, we present exact and heuristic methods for MINLP, the development of which was motivated by applications in gas transport optimization. In this talk, we present a sample of our approaches and focus on provable results for both the exact and the heuristic methods. The methods have been applied on both academic and real-world instances. We first discuss an algorithm to solve MINLP that is based on a hierarchy of piecewise-linear relaxations and discuss a convergence result for this algorithm. We then show how we can use a combination of penalty and alternating-direction methods to solve difficult instances of gas transport optimization problems and on instances from the MINLPLib. For these methods, we can also give convergence results and discuss their relation to feasibility pump methods.

[1,2,3,4,5] Friedrich-Alexander-Universität Erlangen-Nrnberg (FAU)
Discrete Optimization
Cauerstr. 11, 91058 Erlangen, Germany
{*robert.burlacu, lars.schewe, mar.schmidt*}*@fau.de*
{*geissler, morsi*}*@developt.de*

[4,5] Energie Campus Nürnberg
Fürther Str. 250, 90429 Nürnberg, Germany