

Feasibility Checks in Stationary Models of Gas Transport

R. Gollmer¹, R. Schultz², and C. Stangl³

Abstract: Checking the feasibility of gas transportation orders between entries and exits in a gas network is a recurring task in gas transportation companies. In its most basic form, the problem is to decide whether a certain quantity of gas can be sent through the network from prescribed entries to prescribed exit points. In the stationary case, the physics of gas flow together with technological and commercial side conditions lead to a pretty big (nonlinear, mixed-integer, finite dimensional) inequality system. The issue is to find an operation plan for the active elements of the network (valves, control valves, compressors). For the stationary case, we present a heuristic for making these operational decisions. A key component of the heuristic is to eliminate flow variables from the nonlinear system of flow conservation and pressure drop constraints. The method employs standard solvers in its NLP parts and allows to check feasibility in real-world meshed gas networks.

^{1,2,3} Optimization and Discrete Mathematics, Department of Mathematics
University of Duisburg-Essen
Forsthausweg 2 , 47057 Duisburg, Germany
claudia.stangl@uni-due.de