

Analysis of Operating Modes of Complex Compressor Stations

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Abstract

We consider the modeling of operation modes for complex compressor stations (i.e., ones with several in- or outlets) in gas networks. In particular, we propose a refined model that allows to precompute tighter relaxations for each operation mode. These relaxations may be used to strengthen the compressor station submodels in gas network optimization problems. We provide a procedure to obtain the refined model from the input data for the original model.

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References

1. Carter, R.G.: Compressor station optimization: computational accuracy and speed. Technical Report PSIG 9605. Pipeline Simulation Interest Group (1996) [Google Scholar](https://scholar.google.com/scholar?q=Carter%2C%20R.G.%3A%20Compressor%20station%20optimization%3A%20computational%20accuracy%20and%20speed.%20Technical%20Report%20PSIG%209605.%20Pipeline%20Simulation%20Interest%20Group%20%281996%29) (https://scholar.google.com/scholar?q=Carter%2C%20R.G.%3A%20Compressor%20station%20optimization%3A%20computational%20accuracy%20and%20speed.%20Technical%20Report%20PSIG%209605.%20Pipeline%20Simulation%20Interest%20Group%20%281996%29)

2. Koch, T., Hiller, B., Pfetsch, M., Schewe, L (eds.): Evaluating gas network capacities. MOS-SIAM Series on Optimization. SIAM (2015)
[Google Scholar](https://scholar.google.com/scholar?q=Koch%2C%20T.%2C%20Hiller%2C%20B.%2C%20Pfetsch%2C%20M.%2C%20Schewe%2C%20L%20%28eds.%29%3A%20Evaluating%20gas%20network%20capacities.%20MOS-SIAM%20Series%20on%20Optimization.%20SIAM%20%282015%29) (<https://scholar.google.com/scholar?q=Koch%2C%20T.%2C%20Hiller%2C%20B.%2C%20Pfetsch%2C%20M.%2C%20Schewe%2C%20L%20%28eds.%29%3A%20Evaluating%20gas%20network%20capacities.%20MOS-SIAM%20Series%20on%20Optimization.%20SIAM%20%282015%29>)
3. Martin, A., Möller, M., Moritz, S.: Mixed integer models for the stationary case of gas network optimization. *Math. Program.* **105**(2), 563–582 (2006)
[CrossRef](https://doi.org/10.1007/s10107-005-0665-5) (<https://doi.org/10.1007/s10107-005-0665-5>)
[Google Scholar](http://scholar.google.com/scholar_lookup?title=Mixed%20integer%20models%20for%20the%20stationary%20case%20of%20gas%20network%20optimization&author=A.%20Martin&author=M.%20M%C3%B6ller&author=S.%20Moritz&journal=Math.%20Program.&volume=105&issue=2&pages=563-582&publication_year=2006) (http://scholar.google.com/scholar_lookup?title=Mixed%20integer%20models%20for%20the%20stationary%20case%20of%20gas%20network%20optimization&author=A.%20Martin&author=M.%20M%C3%B6ller&author=S.%20Moritz&journal=Math.%20Program.&volume=105&issue=2&pages=563-582&publication_year=2006)
4. Rose, D., Schmidt, M., Steinbach, M.C., Willert, B.M.: Computational optimization of gas compressor stations: MINLP models versus continuous reformulations. *Math. Methods Oper. Res.* **83**(3), 409–444 (2016)
[CrossRef](https://doi.org/10.1007/s00186-016-0533-5) (<https://doi.org/10.1007/s00186-016-0533-5>)
[Google Scholar](http://scholar.google.com/scholar_lookup?title=Computational%20optimization%20of%20gas%20compressor%20stations%3A%20MINLP%20models%20versus%20continuous%20reformulations&author=D.%20Rose&author=M.%20Schmidt&author=MC.%20Steinbach&author=BM.%20Willert&journal=Math.%20Methods%20Oper.%20Res.&volume=83&issue=3&pages=409-444&publication_year=2016) (http://scholar.google.com/scholar_lookup?title=Computational%20optimization%20of%20gas%20compressor%20stations%3A%20MINLP%20models%20versus%20continuous%20reformulations&author=D.%20Rose&author=M.%20Schmidt&author=MC.%20Steinbach&author=BM.%20Willert&journal=Math.%20Methods%20Oper.%20Res.&volume=83&issue=3&pages=409-444&publication_year=2016)
5. Ríos-Mercado, R.S., Borraz-Sánchez, C.: Optimization problems in natural gas transportation systems: a state-of-the-art review. *Appl. Energ.* **147**, 536–555 (2015)
[Google Scholar](https://scholar.google.com/scholar?q=R%3ADos-Mercado%2C%20R.S.%2C%20Borraz-S%3A1nchez%2C%20C.%3A%20Optimization%20problems%20in%20natural%20gas%20transportation%20systems%3A%20a%20state-of-the-art%20review.%20Appl.%20Energ.%20147%2C%20536%E2%80%93555%20%282015%29) (<https://scholar.google.com/scholar?q=R%3ADos-Mercado%2C%20R.S.%2C%20Borraz-S%3A1nchez%2C%20C.%3A%20Optimization%20problems%20in%20natural%20gas%20transportation%20systems%3A%20a%20state-of-the-art%20review.%20Appl.%20Energ.%20147%2C%20536%E2%80%93555%20%282015%29>)
6. van der Hoeven, T.: Math in gas and the art of linearization. Ph.D. thesis, Rijksuniversiteit Groningen (2004)
[Google Scholar](https://scholar.google.com/scholar?q=van%20der%20Hoeven%2C%20T.%3A%20Math%20in%20gas%20and%20the%20art%20of%20linearization.%20Ph.D.%20thesis%2C%20Rijksuniversiteit%20Groningen%20%282004%29) (<https://scholar.google.com/scholar?q=van%20der%20Hoeven%2C%20T.%3A%20Math%20in%20gas%20and%20the%20art%20of%20linearization.%20Ph.D.%20thesis%2C%20Rijksuniversiteit%20Groningen%20%282004%29>)
7. Wu, S., Ríos-Mercado, R.Z., Boyd, E.A., Scott, L.R.: Model relaxations for the fuel cost minimization of steady-state gas pipeline networks. *Math. Comput. Model.* **31**(2), 197–220 (2000)
[CrossRef](https://doi.org/10.1016/S0895-7177(99)00232-0) ([https://doi.org/10.1016/S0895-7177\(99\)00232-0](https://doi.org/10.1016/S0895-7177(99)00232-0))

[Google Scholar \(http://scholar.google.com/scholar_lookup?title=Model%20relaxations%20for%20the%20fuel%20cost%20minimization%20of%20steady-state%20gas%20pipeline%20networks&author=S.%20Wu&author=RZ.%20RC3%ADos-Mercado&author=EA.%20Boyd&author=LR.%20Scott&journal=Math.%20Comput.%20Model.&volume=31&issue=2&pages=197-220&publication_year=2000\)](http://scholar.google.com/scholar_lookup?title=Model%20relaxations%20for%20the%20fuel%20cost%20minimization%20of%20steady-state%20gas%20pipeline%20networks&author=S.%20Wu&author=RZ.%20RC3%ADos-Mercado&author=EA.%20Boyd&author=LR.%20Scott&journal=Math.%20Comput.%20Model.&volume=31&issue=2&pages=197-220&publication_year=2000)

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