Solving MINLP with Heat Exchangers: Special Structure Detection and Large-Scale Global Optimisation

Ruth Misener and Miten Mistry

{r.misener, miten.mistry11}@imperial.ac.uk

Department of Computing
Imperial College London
South Kensington Campus, London SW7 2AZ

Optimising heat exchangers networks (HEN) may increase efficiency in industrial plants; we develop deterministic global optimisation algorithms for a mixed-integer nonlinear optimisation (MINLP) model that simultaneously incorporates utility cost, equipment area, and hot / cold stream matches [1, 3]. In this work, we automatically recognise and exploit special mathematical structures common in HEN including log mean temperature difference and Chen approximation; we computationally demonstrate the impact on the global optimisation solver ANTIGONE [2] and benchmark large-scale test cases against heuristic approaches.

References

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