Global Optimization of Procurement Planning of Refinery Integrated with Production System Using McCormick Envelope Method

최예찬, 신주현, 노경석[1], 이재형[†]

KAIST; [1]Global Technology, SK Innovation CO., Ltd.

(jayhlee@kaist.ac.kr[†])

In this research, the global optimization of procurement planning and its integration with production planning of a refinery is addressed. The complete integration of the optimization models of procurement planning and refining process operation is most desirable, but it is currently challenging in computation due to the very large size of the resulting optimization problem. An alternative to the fully integrated optimization is to minimize the difference between optimal crude profile demanded by the production system and the actual crude profile supplied from the procurement system. The effect of each deviance between supply and demand of the crude to the production system is quantified as a weight parameter using marginal value. However, the following mathematical problem, which takes a form of mixed integer bi−linear programming (MIBLP) is still too large and complex to assure global optimality with current global MINLP solvers. In this research, McCormick envelopes are used as a relaxation to achieve global optimal solution of the MIBLP. The objective value and the computation time of the various mathematical programming solvers and relaxation methods are compared.