A Study of Plant Layout Optimization based on a Mathematical Modeling and Operating Conditions

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In the fields of researches associated with plant layout optimization, the main goal is to minimize the costs of pipelines and pumping between connecting equipment under various constraints. However, what is the lacking of considerations in previous researches is to transform various heuristics or safety regulations into mathematical equation. Also, there are few researches considering operating conditions associated with a pressure drop and a heat loss. In this study, the MILP problem including safety distances, maintenance spaces, a pressure drop, a heat loss, etc. is proposed based on mathematical equations. The objective function is a summation of pipeline, pumping costs and energy consumptions due to a pressure drop and a heat loss. And, various safety and maintenance conditions are transformed into inequality or equality constraints. In this study, the PSO technique is employed to solve an optimization problem. The LNG plant is illustrated to verify the efficacy of this study.