Study of Multi Floor Plant Layout Optimization Based on Particle Swarm Optimization

―――――*

(changjunlee@pknu.ac.kr*)

In the fields of researches associated with plant layout optimization, the main goal is to minimize the costs of pipelines for connecting equipment. However, what is the lacking of considerations in previous researches is to handle the multi floor processes considering the safety distances. The mathematical programming formulation can be transformed into MILP (Mixed Integer Linear Programming) problems as considering safety distances, maintenance spaces, and economic benefits for solving the multi-floor plant layout problem. The objective function of this problem is to minimize piping costs connecting facilities in the process. However, it is really hard to solve this problem due to complex unequalities or equality constraints such as sufficient spaces for the maintenance and passages, meaning that there are many conditional statements in the objective function. Thus, it is impossible to solve this problem with conventional optimization solvers using the derivatives of objective function. In this study, the PSO (Particle Swarm Optimization) technique, which is one of the representative sampling approaches, is employed and the EO (Ethylene Oxide) plant is illustrated to verify the efficacy of the proposed method.