

Optimal Design and Modelling of Chemical Processes Using Evolutionary Algorithms

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Over the long years of chemical process design research, many researchers have tried to develop mathematical methods that could provide the designer with the optimal process configuration of a process. As a result of these efforts, various methods have been developed and have been in use, such as process design using hierarchical design procedures, and super-structure formation and optimization of chemical processes.

Although these methods have proven to be successful in certain processes, they retain their fundamental limitations, such as uncertainty of the global optimum, and requiring a priori knowledge of the process. Thus, for determining optimal configurations of novel processes to be developed in the future, a different approach is essential.

In this study, a novel methodology for constructing the configuration of a process is developed. Using the memetic genetic algorithm(also known as hybrid GA), different configurations of a process are thoroughly investigated and optimized. Constraints regarding unit operations and thermodynamics are given to define only feasible processes. The developed method was applied to a sample process to test out its usefulness.