

## Modeling and Optimization for Design of Reverse Osmosis Process

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The most widely used desalination processes are membrane separation using reverse osmosis (RO) to supply fresh water in the regions with scarcity of water. In most cases, it is required to select the configuration or topology which components should be included in the design as well as the design parameters of those components such that the performance of the system is maximized. In this study, Genetic algorithm(GA) to solve MINLP problem is used to find the optimal design of reverse osmosis process. To build the model of system, the Spiegler-Kedem model was used and the concentration polarization phenomenon described using the film theory has been taken into account. The objective function to be minimized is the cost which includes the cost for membrane, pump, energy recovery system, intake and pretreatment systems and so on. The effect of varying GA parameters like size of population, selection pressure and mutation probability on the result was also studied.