



Analysis of reverse osmosis system performance using a genetic programming technique

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ABSTRACT

Reverse osmosis (RO) membrane process has been considered a promising technology for water treatment and desalination. However, it is difficult to predict the performance of pilot- or full-scale RO systems because numerous factors are involved in RO performance, including membrane scaling, fouling, and deterioration. This study was intended to develop a practical model for the analysis of pilot-scale RO processes. A genetic programming (GP) technique was applied to correlate key operating parameters and RO permeability statistically. The GP model was trained using a set of experimental data from a RO pilot plant with a capacity of 1,000 m³/day and then used to predict its performance. The comparison of the GP model calculations with the experiment results revealed that the GP model was a useful tool for predicting the efficiency of pilot-scale RO systems. The GP model also allowed the in-depth analysis of RO system performance even under unsteady conditions.

Keywords: Reverse osmosis; Desalination; Genetic programming; Prediction; Model

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