Soft computing techniques in modelling of membrane filtration system: a review

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ABSTRACT

The complexity of the membrane filtration system is due to membrane fouling problem, which reduce the performance of the system. This is the most challenging issue for further membrane control system design and applications. Pursuant to the understanding of different mechanisms of fouling, various modelling approaches have been explored. Modelling of membrane bioreactor filtration system has been extensively employed for the purpose of predicting dynamic behaviour of the process. The application of soft computing in solving real-life problems has become an upward trend nowadays. This paper reviews on the application of soft computing techniques to model, predict and optimize the membrane bioreactor filtration system. A brief review on membrane filtration process for reverse osmosis and other related solid liquid separation processes is also given. Due to the non-linearity of the filtration process and almost impossible to represent it using standard mathematical equation, the application of artificial intelligent based models such as neural network, knowledge-based, fuzzy system and adaptive neuro-fuzzy is investigated and reviewed. For better prediction of models, the application of soft computing tools in the framework of optimization scheme such as genetic algorithm, particle swarm optimization, gravitational search algorithm and hybrid are also reviewed.

Keywords: Membrane filtration; Membrane bioreactor; Soft computing; Artificial intelligent; Optimization; Review

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