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Membrane-based SWRO pretreatment: Knowledge discovery in databases using principal component analysis regression

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ABSTRACT

At the time being there are several technological designs of membrane-based seawater reverse osmosis (SWRO) pretreatment systems on the desalination market. The abundance of different membrane materials and configurations (pressurized/submerged/inside-out/outside-in etc.) combined with site specific conditions make the unbiased assessment of their general performance a difficult task. In this paper we suggest a data mining method based on the principal component analysis (PCA) to serve as a more systematically logical regression tool on currently available literature data. PCA is a multivariate statistical method that uses a linear transformation for dimension reduction and pattern recognition. The results show how this method can be used effectively in the case of SWRO membrane based pretreatment for both literature data reconciliation and reconstruction, as well as for future data prediction.

Keywords: Desalination; Pretreatment; Ultrafiltration; Principal component analysis; Data mining

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