

RESEARCH PAPERS

含再生再利用的用水系统的最小新鲜水和相应的再生水用量的确定

徐冬梅^a, 胡仰栋^a, 华贲^b, 王修林^a^a College of Chemistry and Chemical Engineering, Ocean University of China, Qingdao 266003, China^b Institute of Chemical Engineering, South China University of Technology, Guangzhou 510640, China

收稿日期 修回日期 网络版发布日期 接受日期

摘要 A sequential three-step programming method is proposed for determining the minimum flowrate of freshwater and corresponding regenerated water in water-using system of single contaminant with regeneration reuse. In step 1, a programming with the objective of min fws is used to determine the minimum flowrate of fresh water, in which the mathematical representation is a mixed integer nonlinear programming (MINLP1). Then under the same constraints with step 1, a programming with the objective of min freg in step 2 and a programming with the objective of min Cr in step 3 are subsequently used to determine the minimum flowrate of regenerated water and the minimum inlet concentration to regeneration process corresponding to the minimum flowrate of fresh water based on step 1. The method is easy to apply because we only need to change the objective function but keep the constraints

constant to go along the following steps after step 1. In addition, the relationship between the freshwater flowrate required, fws, and inlet concentration to regeneration process, Cr, is investigated. It is found that there exist three relationships between fws and Cr, which indicate three possibilities for Cb: below the pinch, above the pinch or at the pinch. Therefore, a new conclusion is drawn, which differs from that "regeneration of water at pinch minimizes fresh water flowrate" derived in literature and indicates that in some cases, regeneration at other point also minimizes fresh water flowrate.

关键词 [wastewater minimization](#) [water-using system](#) [reuse](#) [regeneration](#) [mass exchange network](#)

分类号

DOI:

Minimization of the Flowrate of Fresh Water and Corresponding Regenerated Water in Water-using System with Regeneration Reuse

XU Dongmei^a, HU Yangdong^a, HUA Ben^b, WANG Xiulin^a^a College of Chemistry and Chemical Engineering, Ocean University of China, Qingdao 266003, China^b Institute of Chemical Engineering, South China University of Technology, Guangzhou 510640, China

Received Revised Online Accepted

Abstract A sequential three-step programming method is proposed for determining the minimum flowrate of freshwater and corresponding regenerated water in water-using system of single contaminant with regeneration reuse. In step 1, a programming with the objective of min fws is used to determine the minimum flowrate of fresh water, in which the mathematical representation is a mixed integer nonlinear programming (MINLP1). Then under the same constraints with step 1, a programming with the objective of min freg in step 2 and a programming with the objective of min Cr in step 3 are subsequently used to determine the minimum flowrate of regenerated water and the minimum inlet concentration to regeneration process corresponding to the minimum flowrate of fresh water based on step 1. The method is easy to apply because we only need to change the objective function but keep the constraints constant to go along the following steps after step 1. In addition, the relationship between the freshwater flowrate required, fws, and inlet concentration to regeneration

扩展功能

本文信息

▶ [Supporting info](#)▶ [PDF](#) (2437KB)▶ [\[HTML全文\]](#) (0KB)▶ [参考文献](#)

服务与反馈

▶ [把本文推荐给朋友](#)▶ [加入我的书架](#)▶ [加入引用管理器](#)▶ [引用本文](#)▶ [Email Alert](#)▶ [文章反馈](#)▶ [浏览反馈信息](#)

相关信息

▶ [本刊中包含“wastewater minimization”的相关文章](#)

▶ 本文作者相关文章

· [徐冬梅^a](#)· [胡仰栋^a](#)· [华贲^b](#)· [王修林^a](#)

process, Cr , is investigated. It is found that there exist three relationships between fws and Cr , which indicate three possibilities for Cb : below the pinch, above the pinch or at the pinch. Therefore, a new conclusion is drawn, which differs from that "regeneration of water at pinch minimizes fresh water flowrate" derived in literature and indicates that in some cases, regeneration at other point also minimizes fresh water flowrate.

Key words [wastewater minimization](#); [water-using system](#); [reuse](#); [regeneration](#); [mass exchange network](#)

通讯作者:

徐冬梅 ydhuhd@mail.ouqd.edu.cn

作者个人主页: 徐冬梅^a; 胡仰栋^a; 华贲^b; 王修林^a