化工学报 2008 59 (2): 415-419 ISSN: 0438-1157 CN: 11-1946/TQ

过程系统工程

# 含非清晰塔的精馏系统综合

李玉刚，王晓红，郑世清，韩方煜

青岛科技大学计算机与化工研究所

收稿日期 2007-6-26 修回日期 2007-11-7 网络版发布日期 2008-2-20 接受日期

摘要 对综合问题的求解规模和可行域的变化进行讨论，研究了各种流程的代码表示，问题求解以及最终流程简化。非清晰塔引起相同物流的产生，处理方式有三种：独立，合并，及热偶合。它们引起流程多样性，Petlyuk结构只是其中的一种。采用等价简单塔流程表示复杂流程结构，给出并证明了最大简单塔数与中间分配组份数的关系。最大中间组份数为2 时，将在4N-9（N为组份数）个塔的范围内搜索最优解，超出了N-1个塔的范围。此时，分别最多有N-3和N-4组相同的双组份（2股）和单组份物流（4股），各有3种和7种处理方式。通过限制某些结构提高所得流程的实用性。应用结果表明，考虑非清晰塔时，搜索范围扩大，能够获得更加优秀的实用流程。

关键词

非清晰塔 精馏 热集成 综合

分类号



## Synthesis of distillation system considering no-sharp separation

LI Yugang, WANG Xiaohong, ZHENG Shiqing, HAN Fangyu

**Abstract**

The synthesis of a distillation system including no-sharp separations was studied with emphasis on the coding and flowsheet multiformity caused by no-sharp separation.The same streams composed of the same components appeared in the flowsheet, and had three kinds of relationships, i.e ., independent, united, and thermally-coupled.In the genetic programming coding, an integer array was used to denote the relationships for these same streams so as to describe the distillation flowsheet with no-sharp separations.There was an equivalent simple column flowsheet for a complex flowsheet and the maximum number of simple columns (MNSC) in one flowsheet was used to describe the scale of problem.The relationship between MNSC and middle component number (MCN) that was between two key components was presented.As MCN was 2, MNSC was 4N-9, and it meant that the best result would be searched in the space that could include 4N-9 columns instead of N-1.The searching scope was enlarged and better results could be obtained in comparison with only considering sharp separations.

**Key words**

no-sharp separation distillation heat integration synthesis

DOI:

通讯作者 李玉刚 lyg@putech.com.cn