

过程系统工程

基于自动微分的精馏塔优化计算灵敏度分析

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摘要 提出一种基于自动微分和隐函数求导法则的精馏塔优化计算灵敏度分析方法, 可以求出精确的、无截断误差的灵敏度系数, 以反映精馏塔模型中各种不确定因素变化所引起的改变和影响. 精馏塔模型采用的是结合了封闭式和开放式两种建模方式优点的半开放模型. 文中用乙苯精馏塔的优化结果分析验证了该方法的有效性. 通过与差商法的对比, 该方法体现了明显的精度优势.

关键词 [精馏塔半开放模型](#) [自动微分](#) [灵敏度分析](#) [隐函数求导法则](#)

分类号

APPLYING AUTOMATIC DIFFERENTIATION TO SENSITIVITY ANALYSIS IN DISTILLATION COLUMN OPTIMIZATION

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Abstract

In this paper, automatic differentiation is applied to sensitivity analysis in distillation column optimization. Sensitivity analysis was aimed to estimate the influence with the presence of uncertainties in distillation column optimization. The column was modeled in semi-open-equation manner. Automatic differentiation (AD) and implicit function differentiation rule (IFDR) were used to calculate the precise absolute and relative sensitivity coefficients, with no truncation error introduced. The proposed approach was verified in sensitivity analysis of a practical distillation column optimization. Its result was compared with that of the finite difference (FD) method. This approach is not only error-free, but also of general purpose.

Key words [distillation column semi-open equation model](#) [automatic differentiation](#) [sensitivity analysis](#) [implicit function differentiation rule](#)

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