Real−Time Distillation Column Network Optimization by Mathematical Programming and Multivariate Data Analysis

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This paper addresses a modeling and optimization framework for real−time distillation column network optimization and industrial application result is reported. Distillation columns are main energy user in the PTA process and the operation conditions such as feed concentrations are changing frequently, thus online optimization of the distillation column network in the PTA process is very important. Previous researches on column networks are mainly focused on the column sequencing problem which can be used in the stage of process design. To determine optimal operation at real time in the column network, this paper presents bi−level approach, where at the upper level column load distribution is determined and at the lower level unit column optimization is determined. In part I, optimal column load distribution is addressed. Optimal column load distribution is determined by combined use of mathematical programming and multivariate data analysis for use in real time optimization. This approach has been applied to the industrial plant and about 10 % steam consumption saving has been achieved.