

On Choosing Multicomponent Multiphase System Separation Progress Optimization Criteria

A M Kulikov

Industrial University of Tyumen, 38 Volodarskogo st., Tyumen, 625000, Russia

E-mail: lis-prepod@mail.ru

Abstract. The article describes the existing criteria of separation processes optimization. The possibility of application of the general theory of separation for calculation of technological schemes is being justified. The technological, thermodynamical, statistical and economic criteria of separation processes, methods of their analysis and comparison are briefly described. The method of selection of optimization process criteria with technology research, installation engineering schemes and under automatic control of separation processes, as well as statistical planning of extreme experiments was offered.

1. Introduction

Recently, an issue of efficiency criteria and parameters technological processes optimization has been widely discussed. Evaluation of the technological process results is usually carried by several criteria. The interest to general criterion, clearly expressing efficiency of the process, at the first stage was associated with the natural human desire to evaluate the results of their activities.

With the formulation of the problem of optimal automatic control of technological processes and development of cybernetic methods of research, the overall efficiency criterion becomes technically necessary, since it formally defines the direction and point of optimization, the essence of the study.

The approach to the object of study enables us to apply statistical methods of planning of extreme experiments for the prompt identification of optimal process conditions and obtaining its mathematical model.

The validity of this approach is proved by complexity and probabilistic nature of most separation processes.

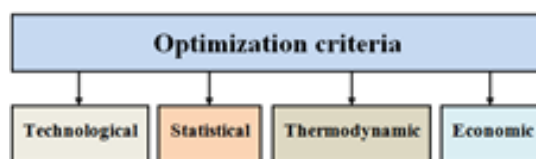


Figure 1. Criteria for technological processes optimization.

In some ways, the choice of optimization criterion determines the results of the study. Because these results, at the beginning of the study, are the question of the future and it is impossible to imagine clearly enough all the consequences of optimization, the choice of criteria is very difficult. It is connected not only with erudition, level of knowledge on the subject under study, but also with the psychology of researcher. Naturally, the criterion may vary during the study. In the final part of the article the authors attempted to provide a general approach to the selection criteria consistent in solving individual problems of the separation process.

Technological, thermodynamical, statistical and economic optimization criteria can be referred to as the most frequently used. At the thermodynamic approach to the separation process using the theory of separation it is possible to develop the application of the principle of minimality of dilution to a wide range of separation processes. This approach makes it possible to select the optimization criteria