Application of mathematical methods of optimization of the process of filtration as part of recovery of used engine oils is considered in the article. The method of the full factorial experiment which contemplates generation of the mathematical model of the filtering process is applied with account for numerous factors and missing data. The mathematical model provides the information about the influence of various factors to identify the quantitative values of response functions in the pre-set mode of the process to serve as the basis for optimization.

Permeability of polymeric membranes, liquid flow velocity and temperature have been chosen as filtration optimization criteria. As a result of the mathematical processing of the experimental data, factors have been calculated and verified in terms of their importance, and the process description has been provided in the form of a regression equation. Dependences obtained by the authors are recommended for use in the calculation of the process of permeability. For example, they may be used to substantiate the periodicity of maintenance of filtration units.

Key words: experiment planning, experimental and statistical model, regression equation, permeability, polymeric membranes, filtering.

References


About the authors: Fedosov Sergey Viktorovich — Doctor of Technical Sciences, Professor, Member, Russian Academy of Architecture and Construction Sciences (RAACS), President, Ivanovo State University of Architecture and Civil Engineering (IGASU), 20 8ogo Marta St., Ivanovo, 153037, Russian Federation; rektor@igasu.ru;

Maslennikov Valeriy Aleksandrovich — Candidate of Technical Sciences, Associate Professor, Chair, Department of Motor Cars and Motor Car Economy, Ivanovo State University of Architecture and Civil Engineering (IGASU), 20 8ogo Marta St., Ivanovo, 153037, Russian Federation;

Osadchiy Yuriy Pavlovich — Candidate of Technical Sciences, Associate Professor, Department of Motor Cars and Motor Car Economy, Ivanovo State University of Architecture and Civil Engineering (IGASU), 20 8ogo Marta St., Ivanovo, 153037, Russian Federation;

Markelov Aleksandr Vladimirovich — Senior Lecturer, Department of Motor Cars and Motor Car Economy, Ivanovo State University of Architecture and Civil Engineering (IGASU), 20 8ogo Marta St., Ivanovo, 153037, Russian Federation; aleksandr203.37@mail.ru.