

A. YA. BOMBA¹, O. V. PRYSIAZHNIUK¹

Modeling of singularly perturbed processes of heat-mass transfer in nanoporous environments

¹ Rivne state humanitarian university, Rivne, Ukraine
E-mail: lenapris@ukr.net

Modeling of heat and mass transfer in nanoporous environments is a promising area of research with regards to the use of filters with nanoporous filling for cleaning polluted streams. Up to date a large amount of publications is devoted to the modeling of adsorption of pollution by nanoporous materials [1, 2], however the question of consideration of all components of heat and mass transfer process in these environments with a goal of prediction of the effectiveness of the cleaning devices that combine adsorptive, chemical and thermal processes, remains relevant. Since the diffusion and mass transfer components of the relevant processes are small comparing to convection ones, corresponding modeling problems, which describes heat and mass transfer in nanoporous media is singularly perturbed, i.e. they have small coefficients in front of some their members. The solutions of these problems were found in the form of asymptotic series [3].

[1] Petryk M.R. Modeling and analysis of concentration fields of nonlinear competitive two-component diffusion in medium of nanoporous particles / Petryk M.R., Fraissard J., Mykhalyk D.M. // *Journal of Automation and Information Sciences*, 2009 — vol. 41, no. 8. — 13-23.

[2] Deineka V.S. Identification of kinetic parameters of one-component adsorptive mass transfer in microporous catalytic media / Deineka V.S., Petryk M.R., Mykhalyk D.M. // *Journal of Automation and Information Sciences*, 2011 — vol. 43, no. 3. — 9-23.

[3] Bomba, A.Ya., Prysiazhniuk, I. M. and Prysiazhniuk, O. V. An asymptotic method for solving a class of singularly perturbed model problems of mass transfer process in different porous environments // *Report of NAN Ukraine*, 2013. —no 3. — 28-34.