

Mathematical modeling of medicinal preparations diffusion process in tissues of the person

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Motivation and Aim: The substance transport problem in the diffusing stratified mediums is a subject of researches both theorists, and practitioners of various areas: medicine, ecology, geology and geophysics. So, in the field of medicine problems of medicinal preparations concentration achievement, necessary for treatment, in the tissues of the person having, as a rule, bedded structure in necessary time slices are relevant. The known mathematical models of medicinal preparations transfer at the surface or intramuscular influences have an appearance of a one-dimensional boundary value problem in the patch and homogeneous stratified mediums. But the used models do not consider anisotropy of diffusion properties of tissues or possible local formations of the changed tissues (for example, oncological tumors) [1]. Therefore, the research of substance mass transfer processes in piecewise constant non-isotropic stratified mediums with inclusions on the example of medicinal preparations diffusion process method of mathematical model operation has important theoretical and applied value and can make an essential contribution to carrying out further scientific research in the field of medicine.

Methods and Algorithms: Means of the computer Maple system developed the programs realizing numerical algorithms of diffusing liquid concentration distribution function finding in the patch and homogeneous horizontally stratified medium with plane-parallel borders, inversion of integral Laplace transform on the basis of the generalized quadrature formulas of the most advanced stage of accuracy [2].

Results: The comparative analysis of computer modeling received results with presented in the considered works of other scientists (for example, [3]) which showed adequacy and reliability of the problem solution offered algorithms is carried out.

Conclusion: The received results in the field of medicinal preparations diffusion process mathematical modeling in tissues of the person are important for definition of parameters number, such, for example, as the dose of the injected medicinal preparation sufficient for achievement of tissues internal departments, time necessary for efficient influence of medicine and so on that is of great importance for treatment of diseases number. Work on creation of three-dimensional problem mathematical model about distribution of the diffusing liquid concentration in the multilayer medium modeling tissue of the person and development of its decision algorithms is at the moment conducted.

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