Ivan Franko National University of L'viv

Mathematical modeling and information technologies in the problem-oriented systems

Scientific supervisor: prof. Shynkarenko Georgiy Andriyovych

Abstract

Mathematical, information and program support for a numerical solution of the variational problems for such problems of a mechanics of continua as: acoustics of liquid interaction with resilient skew fields and shells; updated models of thin-walled resilient constructions and constructions with shell inclusions; migration of passive contaminant in incompressible fluid flows; a surface drain of small-sized fluid flows. Among offered mathematical models the majority are formulated in the terms of the mixed variational problems or/and singular perturbed problems, that required research as correctnesses of the posed problems, sensitivity of their solutions to perturbations of the data, and analysis of conditions of stability and convergence of the projective-grid schemes. In particular, some of the numerical schemes use Raviart-Tomas approximation, non-remains stabilization and strategy of h-adapting. Within the framework of the project the mathematical models for informational-analytical systems of environment monitoring, support of acceptance of administrative solutions concerning a natural resource potential of Lviv region territory and his changes under influence of the natural and anthropogenous factors are developed. The main positions of the project are illustrated by numerical solutions of the diverse model and applied problems.