

ENGLISH ABSTRACT

The aim of this work is to provide a basic overview in numerical modeling of geodynamic processes. Therefore, work is divided into two main parts that almost independently describe its main topic. Both parts are designed to allow reader easily locate sources for more detailed and deeper description of the problem.

The first part deals with the mathematical and physical apparatus, which is used to describe the geodynamic processes and their formalization due to the application for the construction of mathematical models. This section is mainly based on the description of conservation laws and related equations (continuity equation, Navier-Stokes equations, heat transfer equation) and also gives an overview of relations describing the force interactions in solids and rheology.

The second aspect of this work is explanation of the principle of numerical methods (finite differences, finite volumes, finite elements and spectral methods) and their brief overview. In this part, the work is focused on finite differences, a description of which is the main topic of this part.

In last chapter of this work, an example of the implementation of finite difference method for modeling of the thermal evolution of fold structures is given. We elaborate simple kinematic and thermal model to simulate time and spatial evolution of temperature of key areas of fold.