THE FINITE-ELEMENT METHOD APPLICATION FOR INTERPRETATION OF GRAVITY AND MAGNETIC DATA

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In this paper we consider finite-element interpretation technologies of gravity and magnetic data which are used to construct sourcewise approximations of fields and to determine parameters of field sources. A new algorithm of sourcewise approximations of gravity field is described in the paper. The computation process suggests solution of series of problems of one-dimensional optimization resulting in good match of observed and modeled fields with the number of sources lesser than the number of field points. The main characteristics of assembly method for solution of inverse gravity problem and the computing circuit are represented in the article. We suggest a new method of calculation of reliability estimation for interpretation of constructions on the basis of guaranteed approach. A new algorithm for determination of configuration of anomalous objects on interval value assignment of rock density (magnetization) is introduced in the paper. The article shows that application of high-performance computer clusters is productive. Model and practical examples for modeling of sources of geopotential fields are described.

Keywords: gravitational exploration, magnetic exploration, finite-element approach, assembly method, modeling, algorithm.