The harmonic inversion method: calculation of the multi-domain density

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A b s t r a c t: An improved variant of the harmonic inversion method for solving the inverse gravimetric problem is presented. The improvement with respect to the original variant consists of the possibility to calculate the position and shape of many anomalous bodies at once. The solution is sought in the form of a multi-domain density distribution. The calculation begins by placing the germs of future anomalous bodies into the model containing only a set of infinite horizontal layers with constant density; the germs are placed at the points of local extrema of the χ-density that is calculated from the measured surface gravitational field. In an iterative procedure the shape of anomalous bodies is changed until they acquire their final form; in this process the residual χ-density plays a key role. The results of the numerical calculation are discussed.

Key words: gravity inversion, anomalous body, χ-density, integral transformation, iteration

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