

# Processing of big data in the detection of geochemical anomalies of rare-earth metal deposits

Temirbekova Laura <sup>1</sup>

<sup>1</sup> *Abai Kazakh National Pedagogical University, Kazakhstan*  
*Laura-Nuraln@mail.ru*

**Abstract:** The paper presents a numerical method for processing a large amount of data in detection of anomalies of the chemical elements distribution in polymetallic deposits. Mathematically, the problem reduces to solving the Fredholm integral equation of the first kind [1-3] for large number of different right-hand parts, while the kernel remains unchanged.

$$(1) \quad \int_a^b K(x, s)u(s)ds = f(x), \quad x \in [a, b].$$

The algorithm consists of two stages: at the first stage a number of problems are solved, for which knowing the right part is not required, in the second stage, the previously obtained data are used to find solutions of the integral equation for different right-hand sides. This approach allows the data processing "in-situ" and to define prospects of the established abnormal areas, allocate the overriding areas for geological exploration. The algorithm is tested on model and real data.

**Keywords:** ill-posed problem, inverse problem, integral Fredholm equation of the first kind, kernel, conjugate equation, Fourier series, Fourier coefficients, regularization Lavrentieva, geochemical parameters, chemical elements

**2010 Mathematics Subject Classification:** 45B05, 86A22, 49N45, 65Q05

## REFERENCES

- [1] Karchevsky A.L. Reformulation of an inverse problem statement that reduces computational costs // Eurasian Journal of Mathematical and Computer Applications, 2013, v. 1, n. 2, p. 4-20. <https://drive.google.com/file/d/0B2IhUwjYFHEBOUFSTVVfeHhIWfK/view>
- [2] Karchevsky A.L., Marchuk I.V., Kabov O.A. Calculation of the heat flux near the liquid-gas-solid contact line // Applied Mathematical Modelling, 2016, v. 40, n. 2, p. 1029–1037. doi: 10.1016/j.apm.2015.06.018
- [3] Temirbekova L.N., Dairbaeva G. Gradient and Direct Method of solving Gelfand-Levitan Integral Equation // Applied and Computational mathematics, 2013, v. 12, n. 2, p. 234-246.