On the stability estimation of finite-difference analogue of the integral geometry problem with a weight function

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Abstract: The problems of integral geometry are to find the functions, which are determined on certain variety, through its integrals on certain set of subvarities with lower dimension.

Additionally, the problems of integral geometry are correlated with various solutions (data interpretation objectives of exploration seismology, electro-exploration, acoustics, and inverse problems of kinetic equations, widely used in plasma physics and astrophysics). In recent years, the studies on problems of integral geometry have critical significance for tomography, which is intensively developing scientific - technic pillar that has several applications in medicine and industry. Therefore, development of various solution methods for the integral geometry problems is actual issue.

One of the stimuli for studying such problems is their connection with multidimensional inverse problems for differential equations [1]. In some inverse problems for hyperbolic equations were shown to reduce to integral geometry problems and, in particular, a problem of integral geometry was considered in the case of shift-invariant curves. Mukhometov [2] showed the uniqueness and estimated the stability of the solution of a two-dimensional integral geometry on the whole. His results were mainly based on the reduction of the two-dimensional integral geometry problem.

In this work finite - difference analogue of the two-dimensional problem of integral geometry with a weight function are studied. The stability estimate for the considered problem are obtained.

Keywords: integral geometry problem, finite - difference problem, solution, stability.

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