Imaging and clustering of depth estimations for Werner and 2D-Euler deconvolution

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A b s t r a c t : Werner and Euler deconvolution are the most commonly used methods for computer-aided solutions estimation for gravity and magnetics field data. Because of the inherent instability of potential field data, the methods tend to give scattered solutions. Numerical instability estimators as a product of the numerical linear system solvers (SVD, LSQ) can give us a useful numerical information about the instability of the linear systems. Therefore systems of linear equations were computed with Singular Value Decomposition (SVD) method. SVD gives us useful numerical answer about the instability of the linear system, but unfortunately not the one we need to find the most appropriate results. Though, we need an additional method to find the "best" solutions – clustering. We are going to introduce new clustering algorithm, specially developed for deconvolution methods, which takes into an account geometric distribution of the solutions along the defined solution trail. The proposed algorithm will be compared with an independent statistical algorithm on a simple theoretical model.

Key words: magnetic, gravity, Werner deconvolution, Euler deconvolution, profile inversion, potential field inversion, 2D semi-automated interpretation, Singular Value Decomposition, clustering algorithm, data visualization, geophysical interpretation methods

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