



### **3 D gravity inversion based on SL0 norm**

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The inversion of three-dimensional geophysical properties (density, magnetic susceptibility, electrical resistivity) has occupies very important position in geophysical interpretation for geophysical interpreters, combining with the corresponding geological data, it will produce a very good solution to solve the corresponding geological problems, especially, in the separate abnormal body of ore bodies .the method would have produce much more good results.

There are mainly three kinds of mainstream geophysical inversion methods in the now geophysical inversion method : 1. The minimum model method, 2. the most gentle model method, 3. The smoothest model. The main solution is the optimal solution by solving mixed set equations to solve the corresponding inverse problem, the main difference of the three methods is the differences of the weighting function mode, and in essence, it is to find the best solution based on regularization principle, finally, the reaction of the convergence are obtained.

The methods are based on the minimum volume, such as compression inversion and focusing inversion. The two methods also can get much more clearer and sharper boundaries. This abstract choose of the inversion method is based on the theory of minimum volume method. The selection of weighted function can effectively reduce the inversion of the number of iterations and accelerate the rate of inversion. it can conform to the requirements of the current large-scale airborne gravity. Without reducing the quality of the inversion, at the same time, it can accelerate the rate of inversion. The inversion can get the sharp boundary, spatial location, and density attributes of the abnormal body. it needs the quality of the computer performance and geophysical data. Therefore it requests to reduce the random and random noise as far as possible.

According to a lot of model tests, It proves that the choice of the weighting function can get very good inversion result. In the inversion, combining with geological data to select the correct penalty function constraints can make the results more according with the actual geological conditions. Finally, the inversion method is applied to the gravity data of the U.S. state of Texas. The inversion results are basically consistent with the predecessors of the inversion results. It prove the feasibility of the inversion method.