

Sparse 3-D magnetic inversion using combined L1-L2 norm regularization: read data analysis.

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This study proposed an inversion method to determine a 3D magnetic model that reproduces the observed magnetic anomaly. To obtain a sharp and focused magnetic model, proposed method used the combination of L1 and L2 norm regularization. Both of L1 and L2 regularization methods are very popular and promising way for an ill-posed inverse problem. They have useful advantages, but also have drawbacks. The L2 regularization improves the stability of the solution by replacing the ill-posed problem to a nearby well-posed problem, but resultant solution has too smooth nature. L1 regularization provides sparseness of the model, but resultant solution has excessively sparse nature in the case of the potential inverse problem. By incorporating these methods together, we can obtain a stable and appropriately sparse solution. However, in this case, we have to choose two regularization parameters that control the strength of L1 and L2 regularization. So, the way to select these parameters is a critical problem. This paper also provided a procedure to choose the suitable regularization parameters based on L-curve criterion. In our presentation, we show the detail of our proposed inversion method as well as the results obtained by applying our proposed method to the real data acquired by the aeromagnetic survey on some volcano.

Keywords: inversion, geomagnetic structure, sparse regularization