井地有限线源三维电阻率反演研究

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摘要　有限线源的三维电阻率反演，是地学探测研究的重要课题之一.本文主要讨论了以下几个方面的内容：（1）结合反演方程式改进的共轭梯度算法；（2）基于扰动法的线源Jacobi矩阵的近似计算方法及光滑系数矩阵在各个方向上的光滑因子的计算公式；（3）通过分析阻尼系数与修改量校正量对反演结果的影响，提出了利用校正系数对模型修正量进行校正；（4）较为系统的讨论了阻尼系数λ对反演分辨能力的影响，较好的改善了三维电阻率反演中的电性异常体重心的"上漂"现象.数值实验表明，改进后的共轭梯度法反演对初始模型的依赖程度较小，反演能够稳定收敛，对模型的空间位置分辨率较高.

关键词　有限线源,电阻率,三维反演,阻尼系数

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Study on 3-D resistivity inversion for infinite surface-borehole line current source

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Abstract The 3-D inversion for the finite line source is one of the major subjects in the field of the earth inspection. In this paper, the following progress has been discussed: (1) the improved conjugate gradient algorithm which combines the inversion equation; (2) the formulation for velvet gene at all directions and the approximation method of Jacobian matrics based on disturbance method; (3) the model is adjusted by analyzing the influence of damp coefficient and correction factor to inversion result ; (4) the influence of damp coefficient to the resolution of inversion is studied. to some degree, we improved the problem of "barycenter ascending shift" to electric anomalous body in 3-D resistivity inversion. Through numerical simulation, it is found that the improved conjugate gradient algorithm is less dependent on the initial model and resolve, the inversion using this new method can converge to a stable value and shows high resolution to position.

Key words finite line source　3-D　resistivity inversion　damp coefficient

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