

A NUMERICAL METHOD FOR A NONLINEAR PROBLEM IN APPLIED GEOPHYSICS

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The purpose of this work is to detect or infer, by non destructive investigation of soil properties, inhomogeneities in the ground or the presence of particular conductive substances such as metals, minerals and other geological structures. A nonlinear model is used to describe the interaction of an electromagnetic field with the soil.

Starting from electromagnetic data collected by a ground conductivity meter (GPR), we reconstruct the electrical conductivity of the soil with respect to depth, with a regularized Gauss-Newton method. We propose an inversion method, based on the low-rank approximation of the Jacobian of the nonlinear model, which depends on a relaxation parameter and a regularization parameter chosen by automatic procedures. Both on synthetic data sets and on field data

References

- [1] G. P. Deidda, C. Fenu and G. Rodriguez, *Regularized solution of a nonlinear problem in electromagnetic sounding*, Inverse Problems, 30:125014 (27 pages), 2014.