

A TWO-DIMENSIONAL INTEGRAL MODEL TO STUDY SOME PROPERTIES OF THE SUBSOIL

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In this talk, we introduce a two-dimensional first-kind integral model used in applied geophysics to investigate subsoil properties in a non-invasive way. The model describes the interaction between the soil and an electromagnetic device. The aim is to reconstruct the electrical conductivity of the soil from electromagnetic data [1]. The definition of the two-dimensional model is derived, and a numerical study of the forward model based on Gauss-Legendre quadrature formulae is presented. To solve the inverse problem, a linear system obtained from the discretization of the integral equation in the model is considered. The main difficulty is the severe ill-conditioning of the system, so a regularization strategy is applied to obtain good solutions. Some numerical tests show the effectiveness of the proposed approach.

References

- [1] P. Díaz de Alba and F. Pes, *A two-dimensional integral model of the first-kind for LIN electromagnetic data inversion*, Electron. Trans. Numer. Anal., 61 (2024), pp. 105–120.