

REGULARIZED LIN ELECTROMAGNETIC DATA INVERSION VIA A 2D FIRST-KIND INTEGRAL MODEL

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The aim of this work is to reconstruct the electrical conductivity of the subsoil by Frequency Domain Electromagnetic (FDEM) data inversion. To this end, a 2D first-kind integral model which describes the interaction between the soil and an electromagnetic device (usually known as Ground Conductivity Meter) is derived.

On one hand, the resolution of the forward problem is based on the Gauss-Legendre quadrature formula obtaining accurate approximations of the apparent conductivity of the soil. On the other hand, to solve the inverse problem, we discretize the integrals involved in the model leading to a severely ill-conditioned linear system. To overcome this difficulty, we regularize by using a Tikhonov method and we apply different ways to choose the regularization parameter.

Different numerical experiments on synthetic data are presented to show the effectiveness of the entire approach.

References

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- [2] M.A. Pérez-Flores, S. Méndez-Delgado, and E. Gómez-Treviño, *Imaging low-frequency and dc electromagnetic fields using a simple linear approximation*, *Geophysics*, 66(4) (2001), pp. 1067–1081.