

A MULTI-SCALE APPROACH FOR ELECTRICAL DATA INVERSION

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The interpretation of electrical data relies on the resolution of the forward and inverse problems. A multigrid method which allows the fast computation of large matrices is used for the forward problem resolution. The main interest of the multigrid method relies in the connection of 2 approaches. Each one determines different components; (i) the relaxation method determines high-frequency components and (ii) the coarse-grid correction determines low-frequency components. This scheme provides a fast and convergent algorithm. For the inverse problem, we have developed a multi-scale approach which progressively refines the resolution of the model. A sensitivity study is computed before the refinement stage to determine which area of the model will be refined. Each block of the model are refined successively. According to the amount of affected data by the change of resolution, the block is refined otherwise it's frozen. The aim of this methodology is to develop a program which is able to focus the multi-scale refinement on a particular sector leaving the rest of the matrix at a coarser resolution. The difficulty is to define some control parameters and the pertinence of the information provided by the mean resistivity of the coarser area before the refining. The new resistivity of the finest block is estimated by a linear approximation.