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Resistivity Tomography Optimization Based on Parallel Electrode Linear Back Projection Algorithm

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Abstract : Electrical Resistivity Tomography has been widely used in the medicine and the geology, such as the imaging of the lung impedance and the analysis of the soil impedance, etc. Linear Back Projection is the core algorithm of Electrical Resistivity Tomography, but the traditional Linear Back Projection can not make full use of the information of the electric field. In this paper, an imaging method of Parallel Electrode Linear Back Projection for Electrical Resistivity Tomography is proposed, which generates the electric field distribution that is not linearly related to the traditional Linear Back Projection, captures the new information and improves the imaging accuracy without increasing the number of electrodes by changing the connection mode of the electrodes. The simulation results show that the accuracy of the image obtained by the inverse operation obtained by the Parallel Electrode Linear Back Projection can be improved by about 20%.

Keywords : electrical resistivity tomography, finite element simulation, image optimization, parallel electrode linear back projection
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