

**THE IMPLEMENTATION OF HYBRID CONJUGATE
GRADIENT METHOD IN ELECTROMAGNETIC
TOMOGRAPHY**

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ABSTRACT

Electromagnetic tomography (EMT) is a type of electrical tomography based on electromagnetic induction. Reconstructing images with EMT involves solving inverse problems, which are often poorly defined due to limited prior information about imaging features. Optimization methods such as conjugate gradient (CG), Quasi-Newton, and Steepest Descent can help minimize these problems. The conjugate gradient (CG) algorithm is an iterative method that efficiently handles equations with multiple inputs, saving time but requiring more memory. In this research, a hybrid CG method is used to reduce the number of iterations (NOI) and CPU time, achieving excellent numerical performance. This hybrid CG method is then implemented into the EMT system. The efficiency of the EMT and EMT-CG systems is evaluated based on error analysis using RMSE. The findings highlight the hybrid CG method's capability within the EMT system.

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