

Numerical solver of EM induction equation in 3-D anomalous sphere by using integral equation method

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We developed a forward modeling solver of EM induction equation in 3-D anomalous Earth by using the integral equation method. The integral equation method use a semi-analytic Green's function for 1-D background structure so that the numerical solution can be more accurate, but Green's function requires a lot of computational memory and time.

To reduce them, we performed a spherical harmonics expansion in lateral direction and variable separation in vertical direction. Further, we adapted a modified IDM to accelerate the solver, which is well known that the condition number of discrete integral equation is drastically reduced.

We introduce the details of this method.

Keywords: 3-D forward modeling, integral equation method, modified IDM, Green's function, spherical harmonic expansion, variable separation