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Approximating planetary magnetic fields by simplified models using linear regression

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In this paper we attempt to approach the problem of building a non-calculation-intensive model of a planetary magnetic field by fitting the IGRF results with custom parameter values of a simplified multi-variable model, as opposed to the traditional method of solving this problem analytically. We discuss this approach and the results that it produces on the example of approximating the Earth's magnetic field with a shifted dipole's magnetic field. We also discuss the possibilities of using our software to brute-force through an automatically generated set of candidate models in order to find an approximation that satisfies a precondition on either performance or accuracy.