



The inverse problem for the simple dynamo model

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The inverse solution of the 1D Parker dynamo equations is considered. The method [1] is based on minimization of the cost-function, which characterize deviation of the model solution properties from the desired ones. The output is the latitude distribution of the magnetic field generation sources: the α - and ω -effects. Minimization is made using the Monte-Carlo method. The details of the method, as well as some applications, which can be interesting for the broad dynamo community, are considered: conditions when the invisible for the observer at the surface of the planet toroidal part of the magnetic field is much larger than the poloidal counterpart. It is also demonstrated in what circumstances magnetic field in the both hemispheres has different properties (the so-called hemispherical dynamo), and simple physical explanation of this phenomenon is proposed.

References

[1] Reshetnyak M.Yu. Inverse problem in Parker's dynamo. Russ. J. Earth Sci. 2015. 15. ES4001, doi:10.2205/2015ES000558, arXiv:1511.06243