



Astrophysics > Solar and Stellar Astrophysics

Modeling of the subgrid-scale term of the filtered magnetic field transport equation

G. Balarac, A.G. Kosovichev, O. Brugière, A.A. Wray, N.N. Mansour

(Submitted on 27 Oct 2010)

Accurate subgrid-scale turbulence models are needed to perform realistic numerical magnetohydrodynamic (MHD) simulations of the subsurface flows of the Sun. To perform large-eddy simulations (LES) of turbulent MHD flows, three unknown terms have to be modeled. As a first step, this work proposes to use a priori tests to measure the accuracy of various models proposed to predict the SGS term appearing in the transport equation of the filtered magnetic field. It is proposed to evaluate the SGS model accuracy in term of "structural" and "functional" performance, i.e. the model capacity to locally approximate the unknown term and to reproduce its energetic action, respectively. From our tests, it appears that a mixed model based on the scale-similarity model has better performance.

Comments: 10 pages, 5 figures; Center for Turbulence Research, Proceedings of the Summer Program 2010, Stanford University

Subjects: **Solar and Stellar Astrophysics (astro-ph.SR)**; Computational Physics (physics.comp-ph); Fluid Dynamics (physics.flu-dyn); Plasma Physics (physics.plasm-ph)

Cite as: [arXiv:1010.5759v1](https://arxiv.org/abs/1010.5759v1) [astro-ph.SR]

Submission history

From: Alexander Kosovichev [[view email](#)]
[v1] Wed, 27 Oct 2010 18:08:26 GMT (111kb)

[Which authors of this paper are endorsers?](#)

Link back to: [arXiv](#), [form interface](#), [contact](#).

Download:

- [PDF](#)
- [PostScript](#)
- [Other formats](#)

Current browse context:

astro-ph.SR

[< prev](#) | [next >](#)

[new](#) | [recent](#) | [1010](#)

Change to browse by:

[astro-ph](#)

[physics](#)

[physics.comp-ph](#)

[physics.flu-dyn](#)

[physics.plasm-ph](#)

References & Citations

- [SLAC-SPIRES HEP](#)
([refers to](#) | [cited by](#))
- [NASA ADS](#)

Bookmark([what is this?](#))

