

Generalizations of the Arnol'd inequality in MHD

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Summary

The Arnol'd inequality estimates the magnetic energy $U(B) = \int (B; B) dR^3$ from below by means of the magnetic helicity $\chi(B) = \int (A; B) dR^3$ [1], Theorem 1.5 p.122. We prove in [2] a modification of the Arnol'd inequality using the magnetic $U^{(4)}$, $U^{(3/2)}$ —energies and the magnetic quadratic helicity $\chi^{(2)}$ introduced in [3].

References

- [1] Arnold, V.I. & Khesin, B.A. (1998) *Topological Methods in Hydrodynamics*. Applied Mathematical Sciences **125**, Springer-Verlag, Berlin.
- [2] P. M. Akhmet'ev, & E. A. Kudryavtseva, & A.Yu. Smirnov (2016) A generalization of the Arnol'd inequality in MHD. *Russian Conference on Magnetohydrodynamics June 22–25, 2015, Perm, Russia*, in press.
- [3] P. M. Akhmet'ev (2012) Quadratic magnetic helicity and magnetic energy. *Proc. Steklov Math. Inst.*, vol. 278, pp. 16-28.