

Global Minimality of the Hopf Map in the Faddeev-Skyrme Model with Large Coupling Constant

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Abstract

The Faddeev-Skyrme model is a by now classical nonlinear $O(3)$ -sigma model which has proved very successful in quantum field theory, in particular in detecting topological solitons. A prototype mathematical model for fields $u : \mathbb{S}^3 \rightarrow \mathbb{S}^2$ consists of the harmonic map energy together with its symplectic variant acting as a singular perturbation. We prove that, modulo rigid motions, the Hopf map is the unique minimizer of the Faddeev–Skyrme energy in its homotopy class, for an explicit sufficiently large range of the coupling constant. This is joint work with A. Guerra (University of Cambridge) and X. Lamy (University of Toulouse).

References

- [1] A. Guerra, X. Lamy, K. Zemas. *Global minimality of the Hopf map in the Faddeev-Skyrme model with large coupling constant* (2025), arXiv preprint, 2507.10686.