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A Computer Assisted Proof of the Symmetries of Least Energy Nodal Solutions on Squares

Using a Lyapunov-Schmidt reduction on an asymptotic Nehari manifold and verified computations, we prove that the least energy nodal solutions to Lane-Emden equation $-\Delta u = |u|^{p-2}u$ with zero Dirichlet boundary conditions on a square are odd with respect to one diagonal and even with respect to the other one when p is close to 2.

Keywords: Least energy sign changing solutions, symmetries, interval arithmetic, verified computation.

MSC: 35J20; 35B06, 65G40.