

Gradient Flow Finite Element Discretizations with Energy-Based Adaptivity for the Gross-Pitaevskii Equation

Benjamin Stamm (best@mathcces.rwth-aachen.de)

*Mathematics Division of the Center for Computational Engineering Science
RWTH Aachen University*

We present an effective adaptive procedure for the numerical approximation of the steady-state Gross-Pitaevskii equation which consists of a combination of gradient flow iterations and adaptive finite element mesh refinements. The mesh-refinement is solely based on energy minimization. Numerical tests show that this strategy is able to provide highly accurate results, with optimal convergence rates with respect to the number of freedom.