

A functional analytic approach to computer assisted proofs based on Taylor expansions.

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Abstract

In this talk we discuss how the Taylor expansion of analytic functions may be used to study radial solutions of PDEs. We provide a rigorous computer representation of analytic functions (in a disk). We are concerned with both numerical experiments and computer assisted proofs. We discuss the applications of the method to the semilinear Brezis-Nirenberg eigenvalue problem and to the semilinear biharmonic equation $\Delta^2 u = \lambda \exp(u)$.