



Seminar of the Work Group
Nonlinear Partial Differential Equations
WS 23/24

December 12th, 2022, 11:30 - 12:30
Seminar room: SR 3.061

Computer-assisted Existence Proofs for Nonlinear Boundary Value Problems

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Abstract

In this talk we present a computer-assisted method which states existence and local uniqueness of solutions to nonlinear elliptic boundary value problems. Moreover, an enclosure of the solution is given, i.e. we know that there exists a solution in an explicit neighborhood of some approximate solution. The main theorem is based on a fixed-point formulation and in order to satisfy the assumptions of the theorem, some verified numerical computations can be used. This method is illustrated on the basis of a second-order differential equation in divergence form with Dirichlet boundary conditions.