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Implementation of finite element nonlinear Galerkin methods using hierarchical bases.

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Summary: The nonlinear Galerkin methods are investigated in the framework of finite element discretization. We first describe the theoretical background in relation with multilevel and finite element approximations of attractors. Then on the computational side, we recall the definition of the hierarchical bases and analyze the structure associated to these bases. Finally we present the schemes and report on numerical experiments performed on two-dimensional equations of the Burgers and Navier-Stokes type. Their consistency with the approximation that we make and with the structure of the algorithm is discussed.

MSC:

[76M10](#) Finite element methods applied to problems in fluid mechanics

[65M60](#) Finite element, Rayleigh-Ritz and Galerkin methods for initial value and initial-boundary value problems involving PDEs

Cited in **7** Documents

Keywords:

Burgers equation; Navier-Stokes equations; approximations of attractors

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