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Rate optimal adaptive fem with inexact solver for nonlinear operators

Analyzing an algorithm from [Congreve–Wihler, JCAM 311, 2017], we prove convergence with optimal algebraic rates for an adaptive finite element method for nonlinear equations with strongly monotone operator. The analysis also includes the iterative and inexact solution of the arising nonlinear systems by means of the Picard iteration. Using nested iteration, we prove that the number of Picard iterations is generically bounded, and the overall computational cost is (almost) optimal.