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**Low-Order Finite Element Approximation of Nonlinear
Generalized Stokes Problems**

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In this talk a dual-mixed finite element approximation of a nonlinear system of PDEs modeling a generalized Stokes flow is described. Through the introduction of auxiliary unknowns with relevant physical meaning, the method reduces the regularity requirements for the approximation spaces and yields an approach that is well-suited for adaptive computation. The method is analyzed in Sobolev spaces which arise naturally in the problem formulation, and it is shown that lowest-order Raviart-Thomas elements and piecewise constant functions are suitable for approximation. A posteriori error estimates, defined by a nonlinear projection of the residues of the variational problem, are also discussed.