

A DUAL-MIXED APPROXIMATION FOR A HUBER REGULARIZATION OF GENERALIZED P-STOKES VISCOPLASTIC FLOW PROBLEMS.

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ABSTRACT

In this work, we propose a dual-mixed formulation for stationary viscoplastic flows with yield, such as the Bingham or the Herschel-Bulkley flow. The approach is based on a Huber regularization of the viscosity term and a two-fold saddle point nonlinear operator equation for the resulting weak formulation. We provide the uniqueness of solutions for the continuous formulation and propose a discrete scheme based on Arnold-Falk-Winther finite elements. The discretization scheme yields a system of slantly differentiable nonlinear equations, for which a semismooth Newton algorithm is proposed and implemented. Local superlinear convergence of the method is also proved. Finally, we show several numerical experiments in two and three dimensions to illustrate the behavior and efficiency of the method [1].

REFERENCES

- [1] S. González-Andrade, P.E. Méndez. *A Dual-Mixed Approximation for a Huber Regularization of Generalized p -Stokes Viscoplastic Flow Problems*, Computers & Mathematics with Applications. 112 (2022), 76 – 96.

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