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KRYLOV SUBSPACE ACCELERATION FOR NONLINEAR MULTIGRID SCHEMES*

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Abstract. In this paper we present a Krylov acceleration technique for nonlinear PDEs. As a 'preconditioner' we use nonlinear multigrid schemes such as the Full Approximation Scheme (FAS) [1]. The benefits of nonlinear multigrid used in combination with the new accelerator are illustrated by difficult nonlinear elliptic scalar problems, such as the Bratu problem, and for systems of nonlinear equations, such as the Navier-Stokes equations.

Key words. nonlinear Krylov acceleration, nonlinear multigrid, robustness, restarting conditions.

AMS subject classifications. 65N55, 65H10, 65Bxx.

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