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Sara Pollock* (sara.pollock@wright.edu), Dept. of Mathematics and Statistics, Wright State University - 120MM, 3640 Colonel Glenn Highway, Dayton, OH 45435-0001. *Pseudo-time adaptive regularization for quasilinear elliptic PDE.*

The approximation of solutions to nonlinear elliptic problems, particularly those of nonmonotone type, presents unique challenges not encountered in the related problems of linear and nonlinear monotone type. In particular, internal layers in the diffusion coefficient may need to be uncovered during the solution process, which can be highly unstable. Without introduced stabilization, direct linearization methods may produce sequences of divergent iterates which do not approximate the PDE solution. I will discuss adaptive regularization strategies to solve the discrete nonlinear equations induced by finite element discretizations of nonmonotone quasilinear PDE, and discuss the ramifications of adaptive regularization control for running efficient simulations starting from a coarse mesh. (Received September 19, 2016)