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The Return of the Filter Method

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Filters have been introduced as an alternative to penalty functions to promote global convergence for nonlinear optimization algorithms. A filter borrows ideas from multi- objective optimization and accepts a trial point whenever the objective or the constraint violation is improved compared to previous iterates. We present new filter active set approaches to nonlinear optimization based on a two- phase methodology. The first finds an estimate of the optimal active set, and the second phase performs a Newton step on the corresponding equality constrained problem. The approach allows inexact subsystem solves, making it suitable for PDE constrained optimization. Time permitting we present numerical experience on large structured optimization problems.