Abstract.

We provide analysis of Reichel and Beckermann’s Progressive GMRES (ProGMRES) algorithm, a minimum residual method which approximates solutions to a linear system $Ax = b$ where $A \in \mathbb{C}^{n \times n}$ is nearly symmetric. We show that when $A$ is symmetric, and possibly indefinite, the algorithm produces approximations equivalent in exact arithmetic to those produced by MINRES, an established iterative method for symmetric, indefinite linear systems. Numerical experiments imply that ProGMRES is computationally equivalent to MINRES for symmetric, possibly indefinite, matrices. However, in some experiments, ProGMRES appears to be less stable than MINRES.