ICM-9301-47 An Adaptive Richardson Iteration Method for Indefinite Linear systems, D. Calvetti and L. Reichel.

ABSTRACT An adaptive Richardson iteration method is presented for the solution of large linear systems of equations with a sparse, symmetric, nonsingular, indefinite matrix. The relaxation parameters for Richardson iteration are chosen to be reciprocal values of Leja points for a compact set $K := [a, b] \cup [c, d]$, where $[a, b]$ is an interval on the negative real axis and $[c, d]$ is an interval on the positive real axis. End points of these intervals are determined adaptively by computing certain modified moments during the iterations. Computed examples show that this adaptive Richardson algorithm can be competitive with the scheme SYMMLQ [23], which is based on the Lanczos process, as well as with the conjugate residual method.