

ICM-9205-30 Adaptive Chebyshev Iterative Methods for Nonsymmetric Linear Systems Based on Modified Moments, D. Calvetti, G.H. Golub and L. Reichel, Numer. Math. (to appear).

ABSTRACT: Large, sparse nonsymmetric systems of linear equations with a matrix whose eigenvalues lie in the right half plane may be solved by an iterative method based on Chebyshev polynomials for an interval in the complex plane. Knowledge of the convex hull of the spectrum of the matrix is required in order to choose parameters upon which the iteration depends. Adaptive Chebyshev algorithms, in which these parameters are determined by using eigenvalue estimates computed by the power method or modifications thereof, have been described by Manteuffel [16]. This paper presents adaptive Chebyshev iterative methods, in which eigenvalue estimates are computed from modified moments determined during the iterations. The computation of eigenvalue estimates from modified moments requires less computer storage than when eigenvalue estimates are computed by a power method and yields faster convergence for many problems.