

ICM-9304-54 Application of a Block Modified Chebyshev Algorithm to the Iterative Solution of Symmetric Linear Systems With Multiple Right Hand Side Vectors, D. Calvetti and L. Reichel.

ABSTRACT An adaptive Richardson iteration method is described for the solution of large sparse symmetric positive definite linear systems of equations with multiple right-hand side vectors. This scheme “learns” about the linear system to be solved by computing inner products of residual matrices during the iterations. These inner products are interpreted as block modified moments. A block version of the modified Chebyshev algorithm is presented which yields a block tridiagonal matrix from the block modified moments and the recursion coefficients of the residual polynomials. The eigenvalues of this block tridiagonal matrix define an interval, which determines the choice of relaxation parameters for Richardson iteration. Only minor modifications are necessary in order to obtain a scheme for the solution of symmetric indefinite linear systems with multiple right-hand side vectors. We outline the changes required.