ICM-9110-19 A Chebyshev-Vandermonde Solver, D. Calvetti and L. Reichel, Linear Algebra Appl., 172(1992), pp. 219-229.

ABSTRACT: Let $\{T_j\}_{j=0}^n$ be a family of Chebyshev polynomials for a finite interval $[a,b]$, let $\{x_k\}_{k=0}^n, w_{kj} = T_j(x_k)$. We describe a new fast algorithm for the solution of linear systems of equations of the form $W\mathbf{a} = \mathbf{f}$, and compare it with a fast solution scheme recently proposed by Higham [13]. The latter scheme is a modification of the Björk-Pereyra algorithm, and the computed solution depends on the ordering of the nodes x_k. Our algorithm is designed so that the computed solution is essentially independent of the ordering of the x_k. Extensive computational experience indicates that our algorithm generally yields higher accuracy in the computed solution than the scheme in [13].