

1057-65-310

Carl Jagels*, Hanover College, PO Box 890, Hanover, IN 47243, and **Lothar Reichel**. *Rational approximations of matrix functions.*

Matrix function approximation schemes based on the Lanczos method applied to a large, possibly sparse, symmetric matrix, A , are polynomial based methods. An orthonormal basis for the Krylov subspace of smaller dimension is determined, and then a projection onto this subspace is evaluated by a method designed for small problems. Analogous methods based on the extended Krylov subspace $\mathbb{K}^{m,mi+1}(A) = \text{span}\{A^{-m+1}\mathbf{v}, \dots, A^{-1}\mathbf{v}, \mathbf{v}, A\mathbf{v}, \dots, A^{mi}\mathbf{v}\}$, have recently been explored. $m = 1$ yields the standard Lanczos polynomial based method whereas $m \geq 2$ yield rational approximation methods. These methods are discussed and some experimental results for $m = 1, 2, 3, 4$ are presented. (Received January 25, 2010)