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**Analytic Properties of Moments Matrices** WILLIAM J. MASSANO, SUNY Maritime, VASSILIOS FESSATIDIS, Fordham University, JAY D. MANCINI, Kingsborough College of CUNY, SAMUEL P. BOWEN, Chicago State University, ROBERT K. MURAWSKI, Texas A&M University — Associated with each matrix element of the recently developed Generalized Moments Expansion, GMX$(n, m)$ there is a unique expansion for the ground state energy in terms of the "connected moments" $I_k$ of the Hamiltonian (Phys. Lett. **A**349, 320 [2006]). That is, for any set $\{n, m\}$ a polynomial in the $I_k$'s may be generated to any desired order $L$, which is dependent upon the highest moment calculated. Here we wish to study the eigenvectors and eigenvalues of the GMX matrix itself. Furthermore we investigate the interplay between the set $\{n, m\}$ and the order $L$ of the matrix in determining which combination $\{n, m, L\}$ yields the "best" (i.e. most convergent) result for the ground state energy.

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