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Peer Review

Review of: "On the Application of the Rayleigh-Ritz Method to a Projected Hamiltonian"

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The paper applies the Rayleigh-Ritz method to the projected Hamiltonian H_D and shows that the eigenvalues of H_D can be approached from below by variational means. It also critiques the work of Ding et al. for its assumptions. Concerning the first point, I think the result is a consequence of the Poincaré separation theorem that gives upper/lower bounds for the eigenvalues of a projection of a real symmetric matrix *A* in terms of the eigenvalues of A. The application of the theorem gives the bounds for the eigenvalues of H_D in terms of the eigenvalues of H found in the paper. To me, thus, the results are not surprising. Concerning the second point, if I understand correctly, the paper in question does not rely on infinite-dimensional spaces but instead operates within finite-dimensional ones, acknowledging the practical limitations of numerical methods that necessitate such assumptions. In fact, that paper is framed on the effort of computing excited states by variational means, in the same way that ground states are computed routinely.

Declarations

Potential competing interests: No potential competing interests to declare.

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