Semistochastic Projection

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We introduce a *semistochastic* implementation of the power method to compute the dominant eigenvalue and eigenvector of very large matrices. The method is semistochastic in that the matrix multiplication is partially implemented numerically exactly and partially in the sense of expectation value only. Compared to a fully stochastic method, the semistochastic approach significantly reduces the computational time required to obtain the eigenvalue to a specified statistical uncertainty. This is demonstrated by the application of the semistochastic quantum Monte Carlo method to a molecular system in a discrete basis representation and to a system with a sign problem, the fermion Hubbard model.

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