

QUANTUM DYNAMICAL ENTROPY AND AN ALGORITHM BY GENE GOLUB*

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In memory of Gene Golub

Abstract. The problem of computing the quantum dynamical entropy introduced by Alicki and Fannes requires the trace of the operator function $F(\Omega) = -\Omega \log \Omega$, where Ω is a non-negative, Hermitean operator. Physical significance demands that this operator be a matrix of large order. We study its properties and we derive efficient algorithms to solve this problem, also implementable on parallel machines with distributed memory. We rely on a Lanczos technique for large matrix computations developed by Gene Golub.

Key words. Quantum dynamical entropy, large matrices, Lanczos method, Montecarlo techniques

AMS subject classifications. 65F10, 37M25, 81Q50

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