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Optimal bounds on the quantum speed of subspace evolution

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By a quantum speed limit one usually understands an estimate on how fast a quantum system can evolve between two distinguishable states. The most known quantum speed limit is known in the form of the celebrated Mandelstam-Tamm inequality that bounds the speed of the evolution of a state in terms of its energy dispersion. In contrast to the basic Mandelstam-Tamm inequality, we are concerned not with a single state but with a (possibly infinite-dimensional) subspace which is subject to the Schr\"odinger evolution. By using the concept of maximal angle between subspaces we derive optimal bounds on the speed of such a subspace evolution. These bounds may be viewed as further generalizations of the Mandelstam-Tamm inequality. In the present work we extend some of our previous results [1] to the case of unbounded Hamiltonians.

This is a joint work with Sergio Albeverio.

[1] S.Albeverio and A.K.Motovilov, *Quantum speed limits for time evolution of a system subspace*, arXiv:2011.02778 (2020) [8 pages].

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