

State-dependent Trotter bounds

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The Trotter product formula is a central tool in the study of quantum dynamics and plays an important role in the mathematical description of dynamical decoupling. On one hand, it always converges uniformly in finite-dimensions. Therefore, standard methods are designed to deliver norm error bounds. On the other hand, for unbounded operators we usually obtain only strong convergence under certain domain conditions. Therefore, when deriving error bounds, we need to incorporate the dependency on the input state. In this talk, I discuss how to derive such state-dependent Trotter bounds. Furthermore, I elaborate on applications in quantum chemistry and show how to lift finite-dimensional bounds to infinite dimensions.