Algebraic and Numerical Algorithms for Quantum Evolution TY
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VAN HUELE, Brigham Young University — Quantum evolution requires the manipulation of infinite series of products of non-commuting operators. Lie algebra
techniques allow us to reduce the time-dependent operator calculus to the solution
of a set of coupled differential equations for scalar functions, while automatically
guaranteeing unitarity of the factorized evolution operator. We discuss the development of computer programs to implement this technique of combined factorization
and application to quantum states. We use them on driven anharmonic and optomechanical oscillators to find how transition probabilities in these systems evolve
in time.

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