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Three simple tricks for better Trotterization

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Suzuki-Trotter decompositions of exponential operators like $\exp(Ht)$ are required in almost every branch of numerical physics. Often the exponent under consideration has to be split into more than two operators, for instance as local gates on quantum computers.

In this talk, I will demonstrate how highly optimised schemes originally derived for exactly two operators can be applied to such generic Suzuki-Trotter decompositions.

After this first trick, I will explain what makes an efficient decomposition and how to choose from the large variety available.

Furthermore I will demonstrate that many problems for which a Suzuki-Trotter decomposition might appear to be the canonical ansatz, are better approached with different methods like Taylor expansions.

Topical area

Algorithms and Artificial Intelligence

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