Strang Splitting for the Time-Dependent Schrödinger Equation on Sparse Grids

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The time-dependent Schrödinger equation in moderately many dimensions is discretized in space by a sparse grid pseudo-spectral method. The Strang splitting for the resulting evolutionary problem features first or second order convergence, depending on the smoothness of the potential and of the initial data. In contrast to the full grid case, where the frequency domain is the working place, the proof of the sufficient conditions for the convergence goes in the space realm and uses approximations results in Korobov spaces.

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