Numerical evolutions with the Kadath library

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Abstract

The Kadath library is a numerical library designed to solve PDEs by use of spectral methods. It relies on some time symmetries and thus has mostly been used to study stationary systems or to generate initial data for evolutions. Recently, evolution schemes have been implemented in the library. I will present the latest developments and results obtained with those, what key methods enabled them, how they allow us to validate the library and what are the remaining issues and limitations. So far, the two main types of physical systems that are evolved are: 1) a stationary Schwarzschild black hole – potentially with angular noise added on top – and 2) gravitational wave initial data obtained from Teukolsky waves with m=0 and m=2.

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