Spectral methods for theoretical physics

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Spectral methods are a class of numerical techniques which main feature is to describe functions as a finite sum of orthogonal functions known as the basis functions. The discrete Fourier transform is probably one of the most famous example of spectral methods. Those numerical techniques usually enable to reach very good accuracy at a relatively moderate computational cost. I will present an effort in implementing spectral methods in a very modular manner, in terms of geometry and type of equations. The resulting library called Kadath [1], is intended to be used for a wide class of problems appearing in theoretical physics. I will try to illustrate this modularity by showing several applications in gauge field theory and classical general relativity.

Références

[1] P. Grandclement, *A spectral solver for theoretical physics*, J. Comput. Phys. **229**, 3334 (2010).

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