

Recent advances in the numerical solution of Fractional Differential Equations

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Abstract

Recently, the numerical solution of Caputo Fractional Differential Equations has been tackled by considering a local Fourier expansion of the vector field along a suitable orthonormal Jacobi polynomial basis [1]. In particular, the resulting methods, named *Fractional HBVMs (FHBVMs)* can achieve a spectral accuracy in time, by using a suitable graded mesh or, when possible, a uniform mesh. A thorough framework for the implementation of the methods has been given in [2], resulting in the Matlab[©] code `fhbvm` available at the URL [3]. In case of a non fractional derivative, the methods reduce to the class of energy-conserving Runge-Kutta methods called *Hamiltonian Boundary Value Methods (HBVMs)*, for the efficient numerical solution of Hamiltonian problems [4]. In this talk, the main facts about this approach will be recalled.

References

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- [3] <https://people.dimai.unifi.it/brugnano/fhbvm/>
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