ICNAAM 2023
15th Symposium on Recent Trends in the Numerical Solution of Differential Equations

On Central Part Interpolation Approximations for Fractional differential equations

Arvet Pedas*, Margus Lillemäe, Mikk Vikerpuur

Abstract

The central part interpolation approach was introduced in [1] for solving Fredholm integral equations of the second kind and it has shown accuracy and numerical stability advantages compared to standard piecewise polynomial collocation methods, including collocation at Chebyshev knots [2]. This approach has been modified in [3] and [4] to solve differential equations involving Caputo fractional derivatives. In the present contribution we extend this analysis to a wider class of fractional differential equations.

References

[1] K. Orav-Puurand, G. Vainikko, *Central part interpolation schemes for integral equations*, Numer. Func. Anal. Optim., 30 (2009), 352–370.
[2] K. Orav-Puurand, A. Pedas, G. Vainikko, *Central part interpolation schemes for integral equations with singularities*, J. Integral Equations Appl., 29 (2017), 401–440.
[3] M. Lillemäe, A. Pedas, M. Vikerpuur, *Central part interpolation schemes for a class of fractional initial value problems*, Acta Comment. Univ. Tartu. Math., 26 (2022), 161–178.
[4] M. Lillemäe, A. Pedas, M. Vikerpuur, *Central part interpolation schemes for fractional differential equations*, Appl. Numer. Math. (2023), *in press.*

---

* University of Tartu. Narva street 18, Tartu, Estonia; email: arvet.pedas@ut.ee