Optimal multipoint fractional methods for solving nonlinear problems

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Abstract

Fractional calculus is an extension of classical one, and many properties from this are preserved. The higher degree of freedom of fractional calculus compared to classical one provides the suitable aid for numerous applications in science and engineering. Many real problems can be modeled by using fractional derivatives, and some iterative schemes with these derivatives were proposed in last years for solving nonlinear problems; the conformable fractional derivative has shown the best behavior in the theory and practice, but only the conformable fractional Newton-type procedure has been designed in scalar and vectorial version, holding the quadratic order, and presenting some numerical advantages versus classical versions, respectively. We wonder: Can be obtained higher-order point-to-point fractional methods? Is it possible the design of optimal multipoint fractional schemes? Is attainable the development of a general technique to obtain the conformable fractional version of any classical iterative procedure? We give an answer to these and other questions.

References

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