The Journal of Open Source Software

TaylorSeries.jl: Taylor expansions in one and several variables in Julia

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DOI: 10.21105/joss.00968

Software

- Review
- Repository
- Archive

Submitted: 20 September 2018
Published: 02 October 2018

Summary

`TaylorSeries.jl` (Benet & Sanders, n.d.) provides a framework to use and manipulate Taylor polynomials in one and more variables in the Julia programming language (**???**). It allows to compute elementary functions, e.g. `exp`, of polynomials (`Taylor1`- or `TaylorN`-type objects), where techniques of automatic differentiation are used (Tucker, 2011, Haro, Canadell, Figueras, Luque, & Mondelo (2016)). Differentiation and integration are also implemented.

The package allows to work with different `Number` formats as coefficients of the series, including complex numbers, the arbitrary precision `BigFloats` (Fousse, Hanrot, Lefèvre, Pélissier, & Zimmermann, 2007), `Intervals` (**???**), `ArbFloats` (**???**), as well as `Taylor1` and `TaylorN` objects.

`TaylorSeries.jl` is a core component of `TaylorIntegration.jl` (**???**), whose aim is to perform accurate integration of ODEs using the Taylor method, including jet transport techniques, and of `TaylorModels.jl`, which allows to obtain rigorous polynomial approximations of functions.

Acknowledgements

We are thankful for the additions of all contributors to this project. We acknowledge financial support from PAPIME grants PE-105911 and PE-107114, and PAPIIT grants IG-101113, IG-100616 and IN-117117. LB acknowledges support through a Cátedra Marcos Moshinsky (2013).

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