

Interactive comment on “libmpdata++ 0.1: a library of parallel MPDATA solvers for systems of generalised transport equations” by A. Jaruga et al.

D. Jacobsen (Referee)

jacobsen.douglas@gmail.com

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1 Summary

This paper introduces a new library intended to provide easy to use access to MPDATA advection schemes on regular structured grids. The paper is intended to provide validation of the new library, in addition to representing a users guide for the library. It documents several build and run time parameters for properly configuring the library to perform advection, as well as presenting examples of source code configuring a variety of test cases as well as the output from these test cases.

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The manuscript is well written, and provides a very good introduction to the library and it's capabilities. It thoroughly describes the various options available to a user, and describes how one might use the library for their own advection. The source code is readily available, and builds / runs with little to no effort (assuming the dependencies are installed). I recommend this manuscript for publication in Geoscientific Model Development after some minor modifications.

I was able to build and run the tests included in the library. Some of the tests had exceptions, and cmake was unable to determine the correct OpenMP flag for clang++.

Exceptions were on tests 14 (test_rotating_cone_nug) and 21 (test_mpdata_1d_opt_nug).

The tgv test ran for something like 4 hours without finishing so I killed it and didn't get past it, so I can't comment on if anymore tests had exceptions or not. This was all using commit e0d9c8c.

2 General Comments

It would be nice have the license the code is released under listed somewhere in the manuscript.

Please mention somewhere that this library can only work with regular structured grids. This is obvious from the diagrams and notation of fluxes, but it should be explicitly stated somewhere.

It would be good to include error plots for the test cases that have either analytic solutions, or expected solutions.

Were there any comparisons of threaded vs. non-threaded test cases, to verify threading was performed properly? Also, what sort of performance do you see from the

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threaded version relative to the non-threaded version? Some examples of this would be nice to see, if the threaded version is fully supported.

When building libmpdata++ I was required to install clang++, blitz++, and gnuplot-iostream. Ensure these are all listed as dependencies when building libmpdata++.

There is no tag in the repository labeled v0.1, so it's unclear which version of the repository is actually v0.1 (or that the paper refers to). You could either create a tag, or reference the hash from the repository to help people reproduce the exact same results.

The figures are well described in the body of the manuscript, but it would be nice if the axes were described in the figure comments. If the figure isn't directly next to the describing text, it makes it difficult to figure out what some of the axes are.

The code seems well written, it makes good use of white space and has a lot of comments. Though I would recommend providing some documentation along with the code. Maybe a doxygen config file would be good for auto generating some documentation. While the manuscript is intended to document the code, a manuscript can be a bit dense for someone who just wants to build the library and tie it into their own code. This doesn't directly impact this manuscript at all.

3 Corrections

Page 8180 - Line 1: "This paper accompanies first" -> "This paper accompanies **the** first"

Page 8182 - Line 22: "Each example is accompanied with definition" -> "Each example is accompanied with **the** definition"

Page 8187 - Footnote 12: "multe-dimensional" -> "**multi**-dimensional"

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Page 8248 - Listing 10 Caption: "Initial condition andvelocity" -> "Initial condition **and velocity**"

Interactive comment on Geosci. Model Dev. Discuss., 7, 8179, 2014.

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