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1 Progress

I have the algorithm working. I realized that one needs to average the upwind and downwind fluxes on both the forward and backward sweeps. This table is not exactly the same as the results from the paper. However,

N	L_1 Error	L_1 Order	L_inf Error	L_inf Order	Iterations
20	1.547e-01	NaN	2.093e-02	NaN	36
40	4.508e-02	1.779381	3.390e-03	2.625906	77
80	1.282e-02	1.813684	7.631e-04	2.151225	202
160	3.191e-03	2.006456	1.220e-04	2.645629	501
320	7.179e-04	2.152362	2.469e-05	2.304466	1149
640	1.556e-04	2.206213	4.912e-06	2.329389	2577
1280	3.222e-05	2.271662	9.409e-07	2.384174	5713
2560	6.178e-06	2.382553	1.618e-07	2.539718	12616

Figure 1: This plot is an attempt to reproduce the results from Table 1 in Chen et al.

it clearly shows a fast rate of convergence between second and third order accuracy. I have a few ideas as to why I am not quite achieving the expected accuracy. They have to do with the convergence conditions and how I choose the number of points. I am rather certain that the implementation itself is solid.

2 To Do

For next week I will try to figure out why this plot is different from what is in the paper, improve the performance of the code because it runs rather slowly, and implement the solution to 5.3.1 in Chen et al.