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Lab 1 – Serial AMR Dissipation

Environment:

All test result presented in this report were run on the Oakley cluster using 1 node, 12 ppn, 1GB ram, and a walltime of 2 minutes. The epsilon and affect rate parameters were both set to 0.1. The program was written in pure C and was compiled with an optimization level of 3. Unfortunately, since the program was written in pure C, the only timing methods used were time, clock and unix time (no chrono).

Results:

Detailed runtime information is available in the table below, Figure 1. Four of the 7 data files (1, 2, 50_78, and 50_201) completed execution with clock and time values of 0. Seeing the other test results, this is expected because of how few iterations were required to bring the grids to convergence. The other three data files (200_1166, 400-1636, and 400-12206) had non-zero clock and time values, but the only data file that had a runtime of greater than 1 second, was the 400-12206 grid. When comparing my results to the results produced in the readme file, the iterations until convergence are all very similar, except for the largest data file where my program converged in 72 less iterations and arrived at the same max/min DSV values.

Data File	Iterations	Max DSV	Min DSV	Clock	Time	Real time
1	245	55.836	50.269	0	0	0.003
2	52	118.918	107.279	0	0	0.002
200_1166	14458	0.813	0.731	420000	1	0.424
400_12206	75197	0.087	0.078	21010000	21	21.038
400_1636	22280	1.182	1.064	790000	1	0.797
50_201	2286	4.789	4.31	0	0	0.011
50_78	1508	23.37	21.036	0	0	0.004

Figure 1: Completion metrics for all 7 test grid files

Conclusion:

The fact that the four data files that had clock and time values of 0 resulted in non-zero real time values, lead me to conclude that for serial processes, the unix time(1) utility has the best accuracy. Not only does it split up the “real time” into sys and user, it has an accuracy of 1ms as opposed to 1s with time and 10ms with clock. For parallel programs I believe clock may be a more accurate measurement of work done because it can be used to measure the amount of processing time for each thread instead of the wall clock time that the other two methods use.