User Guide Part 6: Example Calculations

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Overview

This section presents results from 4 different sample calculations, each of which is hyperlinked from the sub-menu on the left. The first two calculations are "blast wave" problems in which a strongly overpressured spherical balls expands into a low-density surrounding medium. Each of these is done in two dimensions and distributed across 4 processors. The first calculation is pure gas dynamics; the second adds an initially uniform magnetic field to the problem. Data is dumped in HDF format; the "zmp_pp.x" post-processing executable is used to assemble the individual per-process data blocks into one global data dump.

The third test is the pressureless collapse problem documented in Paper I of the ZEUS-2D trilogy (**ApJ** Supplment; Volume 80). This test is included as an example in which self-gravity is included. Data is dumped in ASCII format; the problem is run on one processor.

The fourth problem is a 1-D RHD problem following the evolution of supercritical radiating shocks. Data is dumped in ASCII format; the problem is run on 1 processor.

Post-Processing HDF files

When HDF data is dumped, one assemble the data files written at one time slice from each processor into a global data file using the "zmp_pp.x" post-processing executable. The source code for the processor is located in the **zeusmp2/pp** subdirectory. To build the code, simply type "make compile" -- the executable is placed in **exe90** along with zeusmp.x.

To run the post-processor, simply type "zmp_pp.x" and follow the on-screen directions. An example screen session from the assembly of files for the blast wave calculation is provided in this text file. In this example, I typed "hsplice" as the task to perform. The code then printed information about file ID, the number of tiles to assemble, and the number of zones in each tile. The HSPLICE subprogram then asked for the dump number of the files to assemble. There are only two, with ".000" and ".001" suffices. It is sufficient to enter only the number of digits needed to identify the number. After having processed both data dumps, I then entered "-1" to quit the HSPLICE subprogram, and then I typed "quit" to exit the post-processor.

In both blast wave problems, the zmp_inp file is configured to run on four processors, with the both the 1- and 2-coordinates distributed over processors. The file was further configured (in namelist IOCON) so that HDF dumps are written at the beginning and end of the calculation with no intermediate dumps. We therefore have two sets of HDF files at the end of the calculation, which runs to an evolution time of 0.005 seconds:

HDF Data Dumps

Time = 0.000	Time = 0.005
• hdfaa000000.000 • hdfaa010000.000 • hdfaa000100.000 • hdfaa010100.000	• hdfaa000000.001 • hdfaa010000.001 • hdfaa000100.001 • hdfaa010100.001

Use of zmp_pp.x as shown in the screen session results in two global data files: "hdfaa.000" and "hdfaa.001". These data files can then be visualized as the user sees fit.