User Guide Part 4: Running ZEUS-MP

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The Basics

The ZEUS-MP binary executable is called "zeusmp.x" and is located under **zeusmp2/exe90**. The only input file required by the test problems supplied is "zmp_inp", the input parameter file documented at length in Part 3 of this user guide. If the code is compiled as a serial code, then simply typing "zeusmp.x" at the terminal prompt will launch the code. In the more common case of parallel execution, the method of launching the code is -- as experienced users are well aware -- entirely dependent upon the platform. I will therefore leave it up the to User to determine how to launch a job on his platform of choice.

Execution Status

ZEUS-MP is wired to write some information to the TTY as a calculation progresses. A parameter called **mbatch** read in namelist PCON allows the user to interactively query the code's status if mbatch=0. **I DO NOT RECOMMEND USING THIS FEATURE,** reason being that on the IBM SP computers, accidently leaving mbatch=0 when a job is run in batch mode will cause all Hell to break loose and zillions of "illegal character" complaints to be generated during code execution. I don't understand why this happens, and I'm far too lazy to care. If you like to live dangerously and wish to learn more about this feature, look in the subroutine **intchk.F** in the **src90** subdirectory to see what the legal prompt commands are. When radiation transport is turned off, a block of code in **zeusmp.F** periodically writes information on cycle number, evolution time, and timestep to TTY. When radiation transport is turned on, a block of code at the bottom of **grey_fld.F** is active instead, writing cycle/time/timestep information and information on (1) how many Newton-Raphson iterations were required to solve the coupled radiation-energy equations, and (2) the average number of conjugate gradient linear solver iterations were needed for each N-R iteration. Yes, some of us actually care about that.

ZEUS-MP also writes some information in a log file called "zmp_log". If all goes well in a calculation, this file will only contain the values of all the parameters in the **zmp_inp** input namelists as they have been read in. If the code has numerical difficulty and has to cut the timestep size, some information about this will be logged in this file. This will be familiar to users of ZEUS-3D.

Output Data Files

ZEUS-MP follows the convention that, regardless of the type of output file being written, each processor in a parallel calculation writes its private data to a unique file. For example, if HDF files are being written (XHDF4 = .TRUE.), then an 8-processor calculation will dump 8 files every time an HDF dump is performed. As an example, suppose that a 3D calculation was distributed across 8 processors so each coordinate axis was distributed over 2 processors. In this case, NTILES = 2 for each axis. ZEUS-MP imagines that these processors are arranged in a 3D "processor coordinate system" in which each processor has a unique set of coordinates in this system. Our 8 processors would therefore have coordinate values of (0,0,0), (1,0,0), (0,1,0), (1,1,0), (0,0,1), (1,0,1), (0,1,1), and (1,1,1). Each element in the coordinate triple is stored in ZEUS-MP in the 3-element array COORDS. For each processor, COORDS(1), COORDS(2), and

COORDS(3) collectively locate this processor in "process topology," as it is officially known.

A processor's unique set of COORDS values is used to label the output files it writes. In our example, the processor with COORDS = (0,0,0) will write hdf files named "hdfaa000000.XXX", where 2 digits have been allowed for each value of COORDS, and XXX is a numeric string giving the dump number (which begins with "000"). The first dump in the simulation will write 8 files: hdfaa000000.000, hdfaa010000.000, hdfaa000100.000, hdfaa010100.000, hdfaa000001.000, hdfaa010001.000, hdfaa000101.000, and hdfaa010101.000.

You get the idea. This convention is followed for all 3 data formats: HDF4 ("hdfaa...."), ASCII ("usraa..."), and binary restart files ("resaa....").