

3 Quick Start: Example OOMMF Session

STEP 1: Start up the mmLaunch window.

- At the command prompt, when you are in the OOMMF root directory, type

```
tclsh oommf.tcl
```

(The name of the Tcl shell, rendered here as `tclsh`, may vary between systems. This matter is discussed in Sec. 2.1.) Alternatively, you may launch `oommf.tcl` using whatever “point and click” interface is provided by your operating system.

- This will bring up a small window labeled **mmLaunch**. It will come up in background mode, so you will get another prompt in your original window, even before the **mmLaunch** window appears.

STEP 2: Gain access to other useful windows.

- In the **mmLaunch** window, check the box for your host (very likely the only choice available), causing a menu of user account boxes to appear. Check the box corresponding to the account you want to compute on (also very likely only one choice available). This gives a menu of options:
 - **mmArchive**: to auto-save scalar and vector field data
 - **mmDataTable**: to display current values of scalar outputs
 - **mmDisp**: to display vector fields
 - **mmGraph**: to form x-y plots
 - **mmProbEd**: to view or modify a problem for **mmSolve2D** or **Oxsii**
 - **mmSolve2D**: to control the 2D solver
 - **Oxsii**: to control the 3D solver
- Click on **mmDisp**, **mmGraph**, and/or **mmDataTable**, depending on what form of output you want to view. Use **mmArchive** to save data to disk.

STEP 3a: Run a 2D problem.

Load problem:

- In the **mmLaunch** window, click on the **mmProbEd** button.
- In the **mmProbEd** (Sec. 8) window, make menu selection **File|Open...** An **Open File** dialog window will appear. In this window:
 - Double click in the **Path** subwindow to change directories. Several sample problems can be found in the directory `oommf/app/mmpe/examples`.
 - To load a problem, double click on a `*.mif` file (e.g., `prob1.mif`) from the list above the **Filter**: subwindow.

- Modify the problem as desired by clicking on buttons from the main **mmProbEd** window (e.g., **Material Parameters**), and fill out the pop-up forms. A completely new problem may be defined this way.
- If desired, the defined problem may be stored to disk via the **File|Save as...** menu selection.

Initialize solver:

- In the **mmLaunch** window, click on the **mmSolve2D** button to launch an instance of the program **mmSolve2D** (Sec. 10.1).
- Wait for the new solver instance to appear in the **Threads** column in the **mm-Launch** window.
- Check the box next to the **mmSolve2D** entry in the **Threads** column. A window containing an **mmSolve2D** interface will appear.
- In the **mmSolve2D** window:
 - Check **Problem Description** under **Inputs**.
 - Check **mmProbEd** under **Source Threads**.
 - Click **LoadProblem**.
 - A status line will indicate the problem is loading.
 - When the problem is fully loaded, more buttons appear.
 - Check **Scheduled Outputs**.
 - For each desired output (**TotalField**, **Magnetization**, and/or **DataTable**), specify the frequency of update:
 1. Check desired output. This will exhibit the possible output destinations under the Destination Threads heading. Output applications such as **mmDisp**, **mmGraph**, and/or **mmDataTable** must be running to appear in this list.
 2. Check the box next to the desired Destination Thread. This will exhibit Schedule options.
 3. Choose a schedule:
 - * **Iteration**: fill in number and check the box.
 - * **ControlPoint**: fill in number and check the box.
 - * **Interactive**: whenever you click corresponding Interactive output button.

Start calculation:

- In the **mmSolve2D** window, start the calculation with **Run** (which runs until problem completion) or **Relax** (which runs until the next control point is reached).
- If you requested **mmDataTable** output, check the boxes for the desired quantities on the **mmDataTable** (Sec. 11) window under the **Data** menu, so that they appear and are updated as requested in your schedule.
- Similarly, check the box for the desired X, Y1, and Y2 quantities on the **mmGraph** (Sec. 12) window(s) under the **X**, **Y1** and **Y2** menus.

Save and/or display results:

- Vector field data (magnetization and effective field) may be viewed using **mmDisp** (Sec. 13). You can manually save data to disk using the **File|Save as...** menu option in **mmDisp**, or you can send scheduled output to **mmArchive** (Sec. 14) for automatic storage. For example, to save the magnetization state at the end of each control point, start up an instance of **mmArchive** and select the **ControlPoint** check box for **mmArchive** on the **Magnetization** schedule in the solver. This may be done before starting the calculation. (Control points are points in the simulation where the applied field is stepped. These are typically equilibrium states, but depending on the input *.mif file, may be triggered by elapsed simulation time or iteration count.)
- Tabular data may be saved by sending scheduled output from the solver to **mmArchive**, which automatically saves all the data it receives. Alternatively, **mmGraph** can be used to save a subset of the data: schedule output to **mmGraph** as desired, and use either the interactive or automated save functionality of **mmGraph**. You can set up the solver data scheduling before the calculation is started, but you must wait for the first data point to configure **mmGraph** before saving any data. As a workaround, you may configure **mmGraph** by sending it the initial solver state interactively, and then use the **Options|clear Data** menu item in **mmGraph** to remove the initializing data point. If you want to inspect explicit numeric values, use **mmDataTable**, which displays single sets of values in a tabular format. **mmDataTable** has no data save functionality.

Midcourse control:

- In the **mmSolve2D** window, buttons can stop and restart the calculation:
 - **Reset**: Return to beginning of problem.
 - **LoadProblem**: Restart with a new problem.
 - **Run**: Apply a sequence of fields until all complete.
 - **Relax**: Run the ODE at the current applied field until the next control point is reached.
 - **Pause**: Click anytime to stop the solver. Continue simulation from paused point with **Run** or **Relax**.
 - **Field-**: Apply the previous field again.
 - **Field+**: Apply the next field in the list.
- Output options can be changed and new output windows opened.
- When the stopping criteria for the final control point are reached, **mmSolve2D** will pause to allow the user to interactively output final results.

STEP 3b: Run a 3D problem.

Launch solver:

- In the **mmLaunch** window, click on the **Oxsii** button to launch an instance of the program **Oxsii** (Sec. 7.1).
- Wait for the new solver instance to appear in the **Threads** column in the **mm-Launch** window.
- Check the box next to the **Oxsii** entry in the **Threads** column. A window containing an **Oxsii** interface will appear.

Load problem:

- In the **Oxsii** window, select the **File|Load...** menu option. A **Load Problem** dialog box will appear. On this window:
 - Double click in the **Path** subwindow to change directories. Several sample problems can be found in the directory `oommf/app/oxs/examples`.
 - To load a problem, double click on a `*.mif` file (e.g., `stdprobl.mif`) from the list above the **Filter:** subwindow.

The native input format for the 3D solver is the MIF 2.1 (Sec. 17.3) format, which must be composed by hand using a plain text editor. (See the `Oxs_Ext Child Class` (Sec. 7.3) documentation for additional details.) However, MIF 1.1 (i.e., 2D problem) files are readable by **Oxsii**, or may be converted to the MIF 2.1 format using the command line tool **mifconvert** (Sec. 16.12). **mmProbEd** (Sec. 8) also supports an extension to the MIF 1.1 format, namely MIF 1.2, which provides limited 3D functionality. MIF 1.2 files may also be read directly by **Oxsii**. Either way, to run in **Oxsii** a problem created by **mmProbEd**, the problem must first be saved to disk via the **File|Save as...** menu option in **mmProbEd**.

- The status line in the **Oxsii** interface window will indicate the problem is loading.
- When the problem is fully loaded, the status line will show “Pause”, and the top row of buttons (**Reload**, **Reset**, ...) will become active. Also, the Output list will fill with available outputs.
- Set up scheduled outputs. For each desired output
 1. Select the source from the Output list.
 2. Select the receiver from the Destination list.
 3. Specify the frequency of update:
 - **Step:** fill in number and check the box.
 - **Stage:** fill in number and check the box.

The items in the Output list will vary depending on the problem that was loaded. The items in the Destination list reflect the OOMMF data display and archiving programs currently running.

Start calculation:

- In the **Oxsii** window, start the calculation with **Run**, **Relax**, or **Step**.
- If you requested `mmDataTable` output, check the boxes for the desired quantities on the **mmDataTable** (Sec. 11) window under the **Data** menu, so that they appear and are updated as requested in your schedule.

- Similarly, check the box for the desired X, Y1, and Y2 quantities on the **mmGraph** (Sec. 12) window(s) under the **X**, **Y1** and **Y2** menus.

Save and/or display results:

- Vector field data (magnetization and fields) may be viewed using **mmDisp** (Sec. 13). You can manually save data to disk using the **File|Save as...** menu option in **mmDisp**, or you can send scheduled output to **mmArchive** (Sec. 14) for automatic storage. For example, to save the magnetization state at the end of each problem stage, start up an instance of **mmArchive** and select the **Stage** check box for the **Magnetization** output, **mmArchive** destination pair. (Stages denote points in the simulation where some significant event occurs, such as when an equilibrium is reached or some preset simulation time index is met. These criteria are set by the input MIF file.)
- Tabular data may be saved by sending scheduled output from the solver to **mmArchive**, which automatically saves all the data it receives. Alternatively, **mmGraph** can be used to save a subset of the data: schedule output to **mmGraph** as desired, and use either the interactive or automated save functionality of **mmGraph**. You can set up the solver data scheduling before the calculation is started, but you must wait for the first data point to configure **mmGraph** before saving any data. As a workaround, you may configure **mmGraph** by sending it the initial solver state interactively, and then use the **Options|clear Data** menu item in **mmGraph** to remove the initializing data point. If you want to inspect explicit numeric values, use **mmDataTable**, which displays single sets of values in a tabular format. **mmDataTable** has no data save functionality.

Midcourse control:

- In the **Oxsii** window, buttons can stop and restart the calculation:
 - **Reload:** Reload the same file from disk.
 - **Reset:** Return to problem start.
 - **Run:** Step through all stages until all complete.
 - **Relax:** Run until the current stage termination criteria are met.
 - **Step:** Do one solver iteration and then pause.
 - **Pause:** Click anytime to stop the solver. Continue simulation from paused point with **Run**, **Relax** or **Step**.
 - **Stage:** Interactively change the current stage index by either typing the desired stage number (counting from 0) into the **Stage** entry box or by moving the associated slider.
- Output options can be changed and new output windows opened. The **Send** button in the **Oxsii** Schedule subwindow is used to interactively send output to the selected Output + Destination pair.
- When the stage termination (stopping) criteria of the final stage are met, **Oxsii** will pause to allow the user to interactively output final results via the **Send** button.

The batch interface **Boxsi** (Sec. 7.2) terminates automatically when the termination criteria for the final stage are met.

STEP 4: Exit OOMMF.

- Individual OOMMF applications can be terminated by selecting the **File|Exit** menu item from their interface window.
- Selecting **File|Exit** on the **mmLaunch** window will close the **mmLaunch** window, and also the interface windows for any **mmArchive**, **mmSolve2D**, and **Oxsii** applications. However, those applications will continue to run in the background, and their interfaces may be re-displayed by starting a new **mmLaunch** instance.
- To kill all OOMMF applications, select the **File|Exit All OOMMF** option from the **mmLaunch** menu bar.