TOPslicer Tutorial
(based on TOPslicer v0.8.4)

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Decompress the TOPslicer package in a directory and navigate within MATLAB to it. Launch TOPslicer by typing `runTOPslicer` and hitting the enter key in the command window. Alternatively, open the m-file named `runTOPslicer.m` and hit the `F5` key or click the button labeled *Run* on MATLAB's menu. TOPslicer will start and you should see a window like in Figure 1.

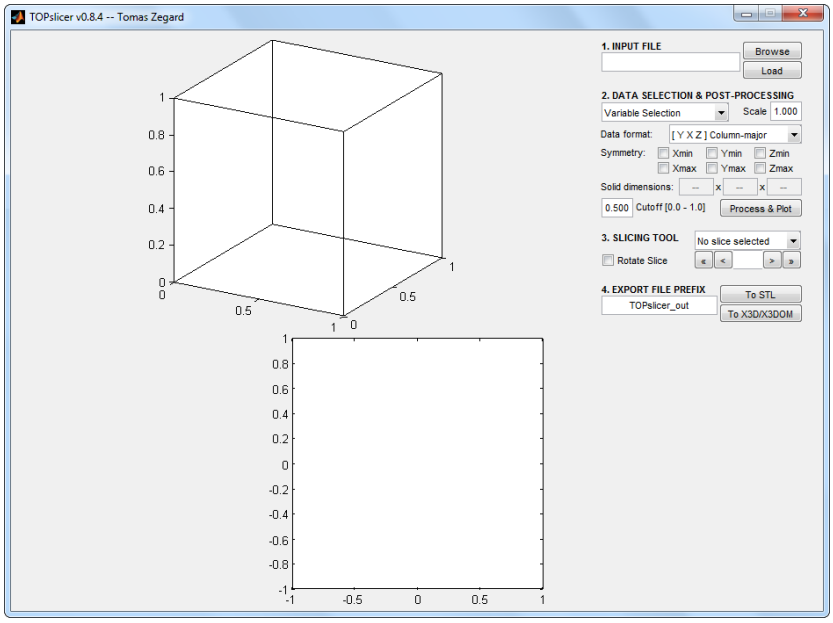

Figure 1: TOPslicer after it has been launched.

The following steps will walk you through plotting, inspecting and generating STL and X3D files using data from the examples bundled with TOPslicer. The relevant section in the TOPslicer menu for each step in this tutorial is indicated with bubbles A through O in Figure 2.

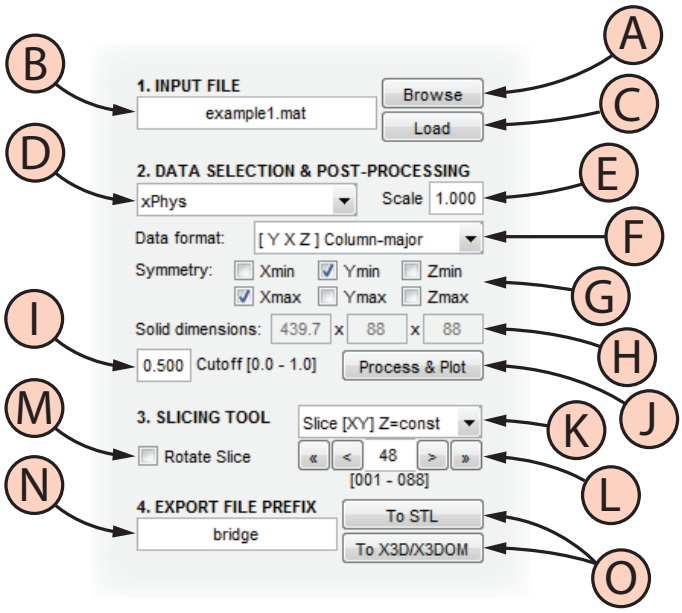

Figure 2: The TOPslicer menu, with labels indicating the section relevant to each step in this tutorial.

A Hit the browse button and select the file `example1.mat` bundled with TOPslicer.

B Notice how the input file path got populated. Alternatively, the user could have typed `example1.mat` directly in this textbox.

C Hit the load button.

D Notice that the variables stored in the mat file populated the pull-down menu. Click on the variable pull-down menu and select `xPhys` (the name of the variable containing the 3D array of densities).

E Type a scale different than 1.0 if your model requires scaling. Leave it as 1.0 for now, but feel free to explore different values later on your own.

F Select the 3D array format. In this case, the data is stored in MATLAB's default convention which is *column-major*. Failure to select the correct convention will result in the data being displayed rotated by some axis or mirrored.

G If symmetry was exploited during the optimization process, it can be restored at this point. The data in `example1.mat` was produced with a quarter-symmetric problem: click to activate symmetry mirroring along the $Xmax$ and $Ymin$ planes.

H The solid dimensions taking into account the scaling, and cutoff value are displayed in the respective textboxes. Right now they are blank since we haven't yet processed the data.

I The cutoff textbox defines the density cutoff value. We will use the default (recommended) value of 0.5 in this tutorial, but feel free to explore different values on your own afterwards.

J Hit the button labeled *Process & Plot*. A bridge should appear in the top view, and the dimensions in step *H* are now populated. If after a few seconds you do not get the result displayed, return to step *A* and try again.

K To inspect the quality of the solution, select a slice plane from the pulldown menu on the slicing tool section. Choose `Slice [XY] Z=const` from the pulldown menu. The lower plot (slice plot) should be updated.

L Use the arrows to slice at different values on the z axis.

M Try clicking the *Rotate Slice* checkbox to rotate the slice plot.

N Once satisfied with the results, type an output file prefix in the corresponding textbox. For this example we will type `bridge`.

O Hit the buttons *To STL* or *To X3D/X3DOM* to generate the respective output. The first one will create a file named `bridge.stl` in the TOPslicer directory, while the second option will create files `bridge.x3d` and `bridge.html`.

Congratulations, you have completed this tutorial. Try some of the other examples bundled with TOPslicer, and explore different options on your own.