

How to Format Topographic Data for BreZo

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BreZo requires ground elevation data for every vertex of the computational mesh. These can be interpolated from survey data or digital elevation models such as those found on <http://seamless.usgs.gov>. I prefer to complete this step using Tecplot, which enables several different interpolation schemes, but there are many alternatives.

Elevation data are input to BreZo using either a .node or .bed file. The .node file is written by Triangle mesh generation software and includes a listing of all vertex coordinates in the mesh in a column format. Consult the Triangle web site for a thorough description on file formatting. If you choose to use different mesh generation software, simply adopt the file formatting described on the Triangle website for .node, .ele, .edge and .neigh files.

To supply terrain data using the .node file, the file should be modified to include an additional column of data which describes the elevation of each vertex. If this option is selected, it is important to set the third integer on the first line of the .node file to 1 instead of zero. Here is an example of a typical .node file with only a few points to illustrate the concept. First, here is a .node file without elevation data.

```
4 2 0 1
1 0.0 0.0 1
2 1000.0 0.0 1
3 1000.0 100.0 1
4 0.0 100.0 1
```

After the first line, the columns correspond to: node (or vertex) number, xvalue, yvalue, and boundary marker (1=boundary, 0=interior point). Next, here is a .node file that includes elevation data: all z values set to 10.0

```
4 2 1 1
1 0.0 0.0 10.0 1
2 1000.0 0.0 10.0 1
3 1000.0 100.0 10.0 1
4 0.0 100.0 10.0 1
```

The columns in this case correspond to: node number, xvalue, yvalue, zvalue, boundary marker. In this example, the four points correspond to corners of a rectangle and therefore fall on the boundary so the boundary marker value is 1. In the general case with many interior vertices, there will be many zeros corresponding to interior points.

The second option is to use a .bed file. A .bed file is just a single column of elevation values listed in the order prescribed by the .node file. Here is a sample .bed file corresponding to the previous example,

```
10.0  
10.0  
10.0  
10.0
```

Note that there are no other data other than the elevation values.

So how does BreZo know whether to load elevation data from the .node or .bed file? BreZo first opens the .node file and if the third integer on the first line is set to 1, then elevation data are read from the .node file. If the integer is set to zero, then it opens and reads a .bed file after it finishes reading the .node file.

If you aren't already familiar with it, I recommend Textpad for reading and manipulating ascii files such as the ones read into BreZo. It has useful features for copying and pasting columns of data that aren't shared by Notepad and Wordpad which are typically installed on Windows machines.