Numerical Methods in Continuum Mechanics II

Tutorial 3

November 8, 2007

8. *Load and plot meshes in Matlab:* Download and extract the file `lshape.zip` from `www.sfb013.uni-linz.ac.at/~peter/`. This will create the directory `lshape` containing `readme.txt`, `elements.mat` and `nodes.mat`. Take a look at `readme.txt`. Then load the data from both `mat`-files in Matlab using the `load` command with the option `-ascii`. Plot the mesh by using each of the commands `triplot` and `trisurf`. Concerning `trisurf`, a z-coordinate is required, which we assume to be 0. Color the triangles randomly with `rand` and play with commands like `axis`, `view`, `colorbar`, `colormap`, and `grid`.

9. *Refine and store meshes:* Implement a Matlab function, which refines meshes via bisecting the edges of each element (see Figure 1). Again, load the mesh of Example 8, and test your Matlab function by refining the mesh a several times consecutively. Then plot the new mesh and save it in new `mat`-files (e. g., same file names but new directory) by using the command `save` with the option `-ascii`. *Remark:* It is important to keep the counter-clockwise ordering of the nodes in each newly created element, whereas it does not matter which node comes first.

10. Solve Example 9.

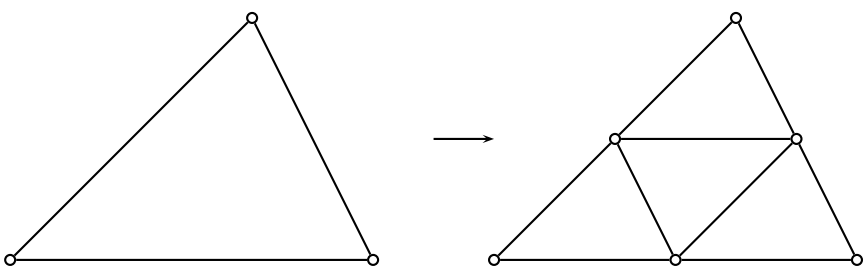

Figure 1: Mesh refinement strategy.