Universität Konstanz
FB Mathematik & Statistik
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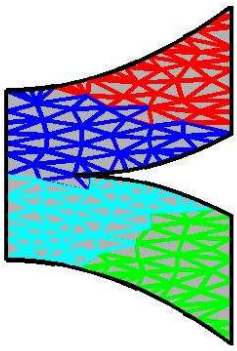
Parallele Numerik

Blatt 6

Problem 8: Load balancing

- **balance the computation among the processors;**
- **minimize the communication among the processors.**



Learn to use the program *partnmesh* of the METIS package (see Weblinks for download, under **www.math.uni-konstanz.de/numerik/**) to partition unstructured triangular meshes.

Online courses with audio (see Weblinks) provides several lecture notes (5th Day [31] [32+32a]) which are very useful.

Unpack the METIS package using: gunzip metis-?.tar.gz followed by tar -xvf metis-?.tar. Go to the new directory metis-? and type *make [all]*. In version metis-4.0, there is a manual metis-4.0/Doc/manual.ps.

1. To generate the mesh use the program Triangle written by Jonathan Richard Shewchuk.

   Unpack the file with *gunzip* and move the file *triangle.shar* to a folder called *triangle*, for example. Enter the folder and type */bin/sh triangle.shar* which will extract the relevant C-files. Then type *make* to generate the source code.

   Call *triangle A.poly* to generate a mesh based on the domain description in A.poly. This call will produce a first meshing with results stored in A.1.*.

   In order to refine this coarse mesh, call *triangle -ra0.002 A.1.ele* (the number after *-ra* determines the typical area of the triangles, you get more triangles if you choose a smaller number).

   You can visualize the mesh by typing *showme A.poly* which opens a window with a picture of the domain and a few buttons.

   Click on the *ele* button in the first row you can see the coarse mesh which you produced with the first call. To see the fine mesh, click on *1 +* on the right followed by another click on the *ele* button in the first row.

   For details about the structure of input and output files type triangle -h.

2. Write a small C program which converts the output of triangle into feasible input for partnmesh.

3. Run partnmesh and visualize the output with matlab (see above figure).