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0.1 Some results

Below find a sample input file for `triangle`. The coordinates of 10 nodes are given first. The nodes 1 through 6 describe the outer boundary, counterclockwise, starting at the lower left corner. Nodes 7 through 10 describe the quadratic hole. Then the segments forming the boundary of the domain are given, including the hole. At last one point inside the hole has to be given. The data is stored in a file `mytest.poly`, in one column of data.

```
# nodes              # segments           # hole
10 2 0 0             10 1                 7 7 8 3
1 0 0                1 1 2 1              8 8 9 3
2 4 0                2 2 3 1              9 9 10 3
3 4 2                3 3 4 1              10 10 7 3
4 1 2                4 4 5 1
5 1 1                5 5 6 2              1
6 0 1                6 6 1 2              1 2.5 1
7 2 0.5
8 3 0.5
9 3 1.5
10 2 1.5
```

Then run the command `triangle -pqa0.01 mytest.poly` to generate the mesh in figure 1. The information is stored in a few files with names `mytest.1.*` . Some statistics are shown by *triangle* on the screen.

```
Statistics:
  Input points: 10
  Input segments: 10
  Input holes: 1
  Mesh points: 518
  Mesh triangles: 907
  Mesh edges: 1425
  Mesh boundary edges: 1
```

triangle is generating meshes suitable for finite element computations, e.g. there are no triangles with small angles. But *triangle* is not concerned with the bandwidth of the resulting matrix for the FEM problem, i.e. neighboring nodes can have a vastly differing numbers.

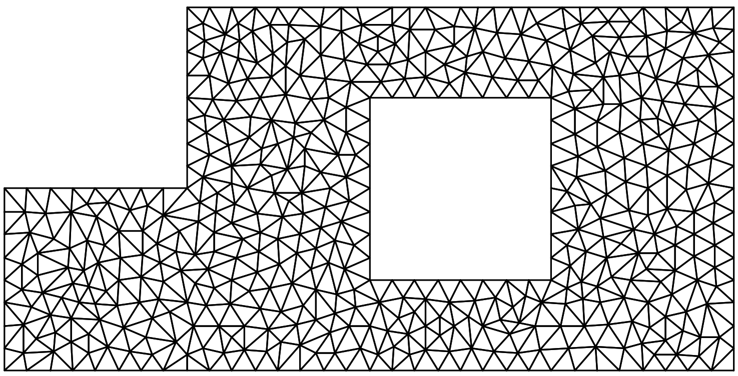

Figure 1: Mesh

The algorithm of **Cuthill–McKee** will renumber the nodes to reduce the bandwidth. The command `CuthillMcKee -v -g mytest.1` reduces the semibandwidth from 515 to 28. In figure 2 the nonzero entries of the matrix are shown. The band structure of the renumbered problem is evident.

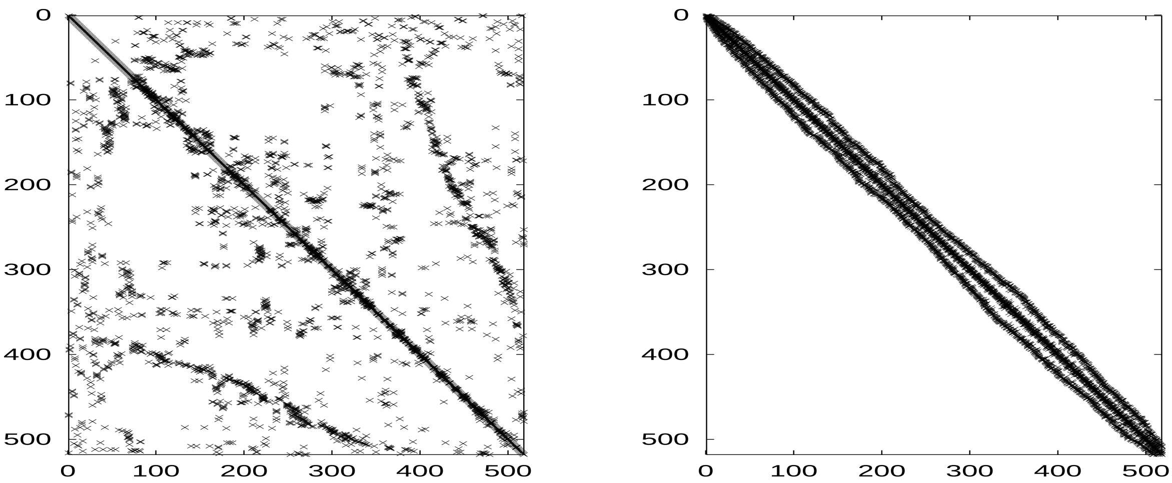

Figure 2: Original numbering and after renumbering by Cuthill–McKee