# Example of Appendix D
Plate with a Central Hole

Problem statement

A rectangular plate with a central circular hole is subjected to tensile loading as shown in Fig. a. The plate has the following dimensions: width W = 4, height H = 8, thickness t = 2. The central whole has the radius R = 1. The plate is loaded by distributed surface forces p = 1 applied at upper and lower plate edges. It is necessary to determine elastic stress state of the plate with a whole

Mesh generation

a   b
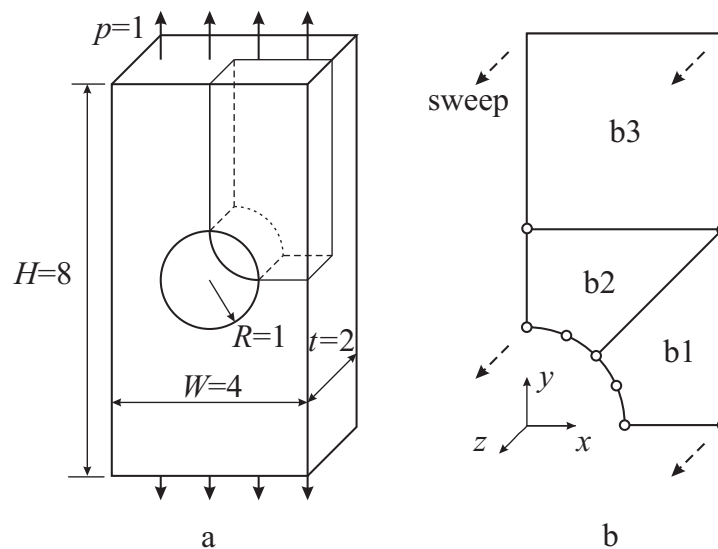
Input data

File `hole3d.gen` - data for mesh generation program `Jmgen` (according to Fig. b).

Program execution

```
java -cp ../classes fea.Jmgen hole3d.gen
```
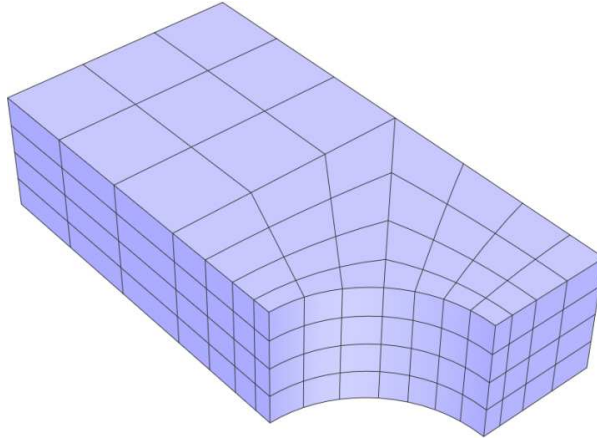or use file `g.bat`

Results

File `hole3d.gen.lst` - listing of mesh generation;
file `hole3d.mesh` - generated finite element mesh.

Mesh visualization

```
java -cp ../classes fea.Jvis hole3d-mesh.vis
```
or use file `vm.bat`.
File `hole3d-mesh.vis` is used as data for visualization.

Mouse interaction: left button - rotate, middle button - scale, right button - translate.

Problem solution

Input data

File `hole3d.fem` - data for solver program `Jfem`;
file `hole3d.mesh` - finite element mesh generated in previous step.

Program execution

```
java -mx500m -cp ../classes fea.Jfem hole3d.fem hole3d.lst
```
or use file `x.bat`

Results

File `hole3d.lst` - listing of problem solution;
file `hole3d.lst.1` - displacements and stresses for load step 1.

Results visualization

Input data

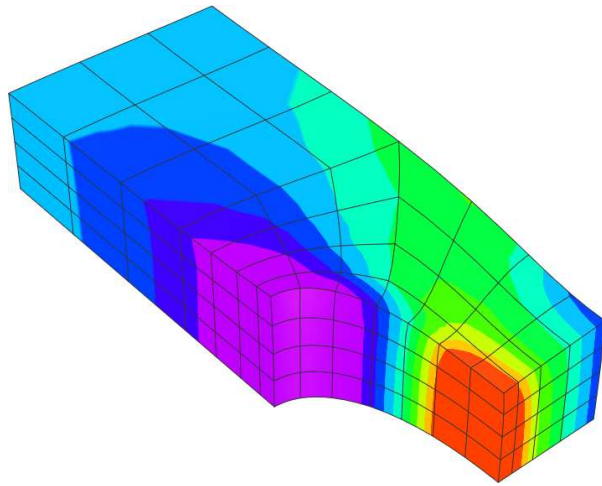File `hole3d.vis` - data for visualizer `Jvis`;
file `hole3d.mesh` - finite element mesh;
file `hole3d.lst.1` - results for load step 1.

Program execution

```
java -cp ../classes fea.Jvis hole3d.vis
```
or use file `v.bat`

Stress σ_y is visualized as ten color contours on the deformed finite element model. Mouse interaction: left button - rotate, middle button - scale, right button - translate.