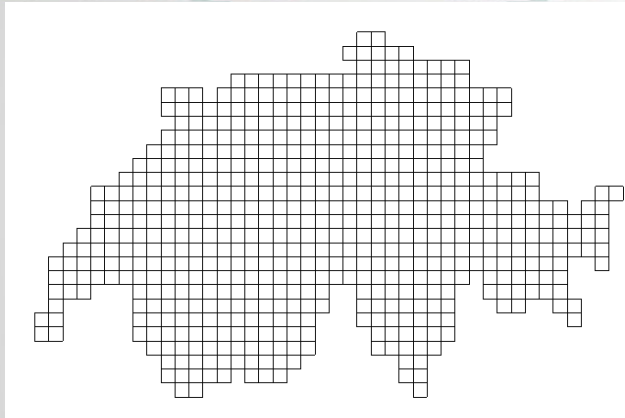


FEM-FDM

Mesh Comparison

Structured (605 control volumes)

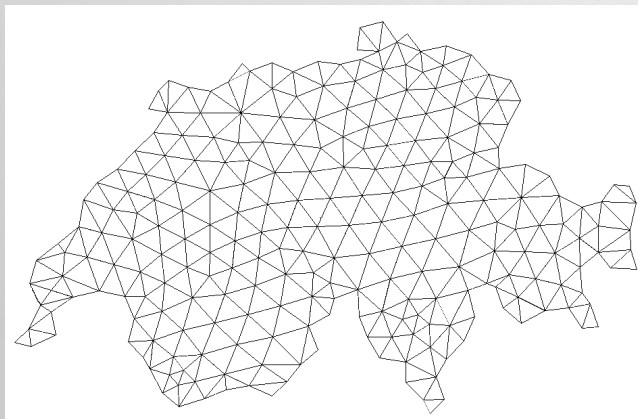


FDM

Switzerland



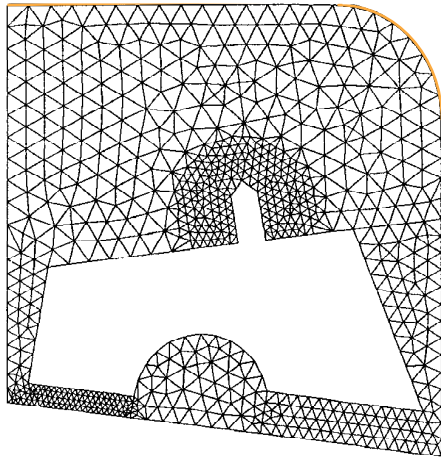
Un-structured (395 control volumes)



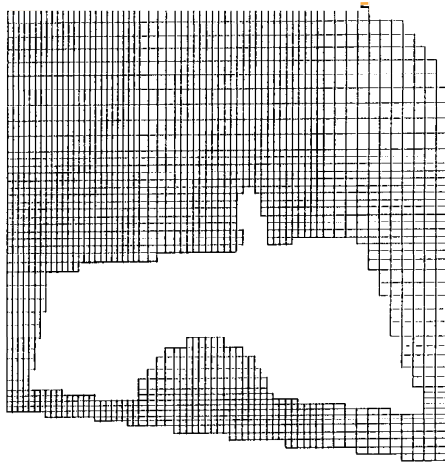
FEM

Summary, FEM vs FDM

Finite Element Method: 806 nodes



Finite Difference Method: 2880 cells

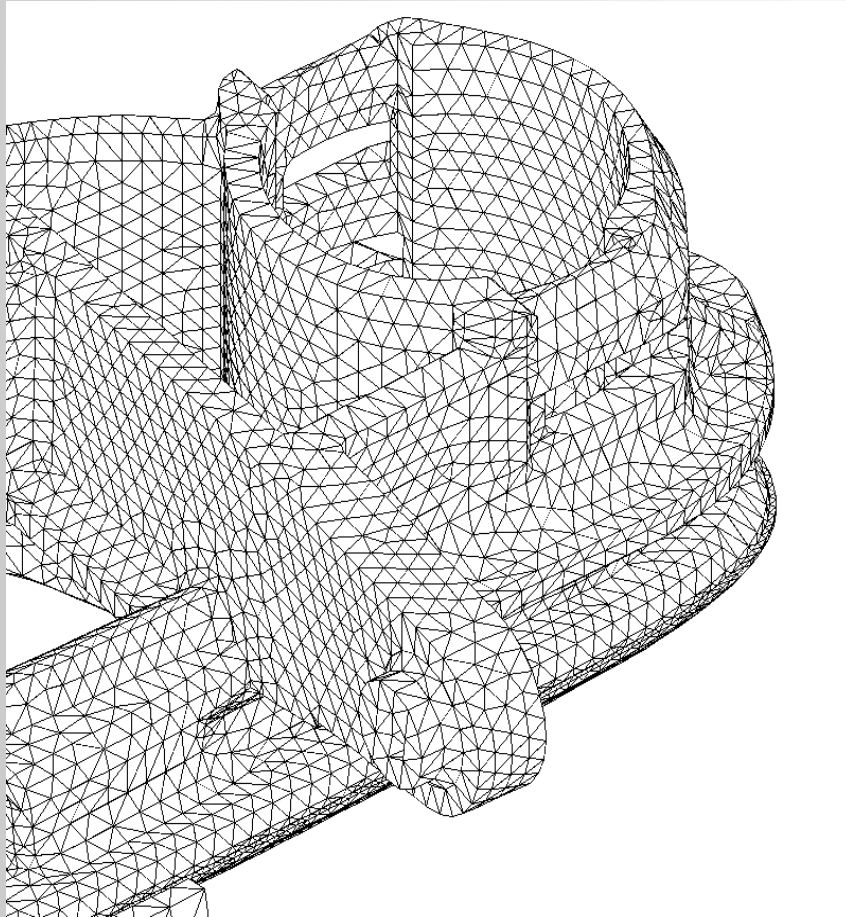


Advantages of finite Elements

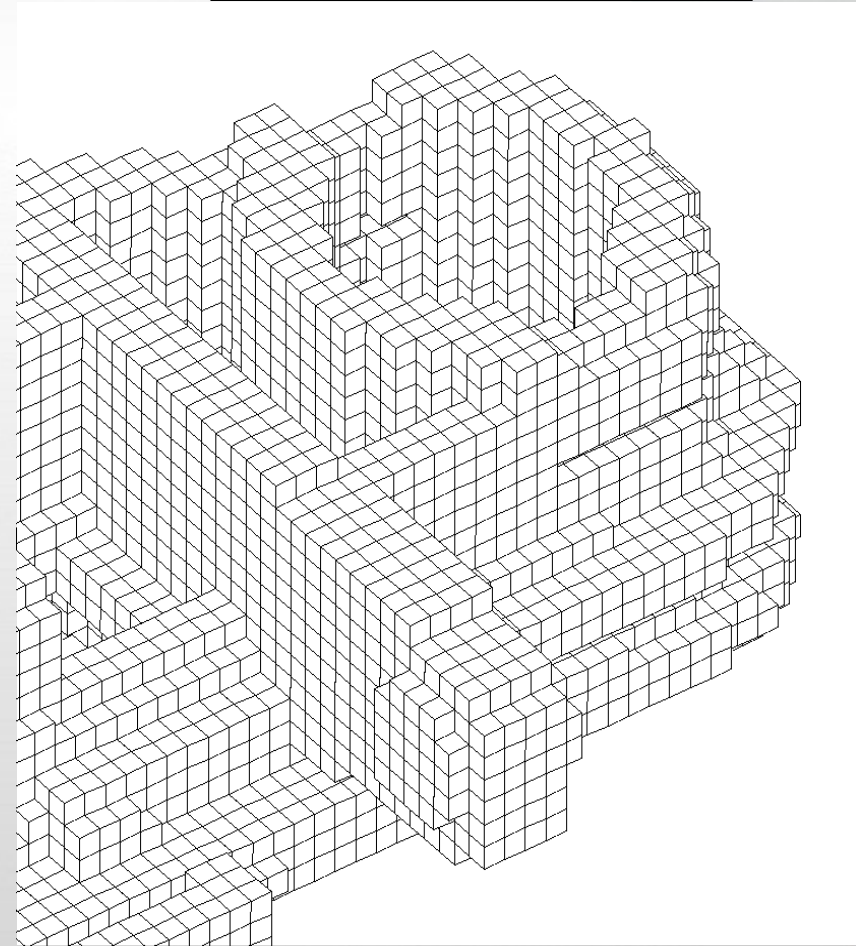
- ⊙ Better description of the geometry
- ⊙ Better treatment of thin sections and complex shapes
- ⊙ Better treatment of fluid flow
- ⊙ Stress calculations
- ⊙ Smaller number of nodes
 - ⊙ less memory space
 - ⊙ less disk space
 - ⊙ shorter run times
- ⊙ Quicker pre - and post-processing
- ⊙ Recognised formulation

Finite Element Method (FEM) / Finite Difference Method (FDM)

Finite Elements (FEM)

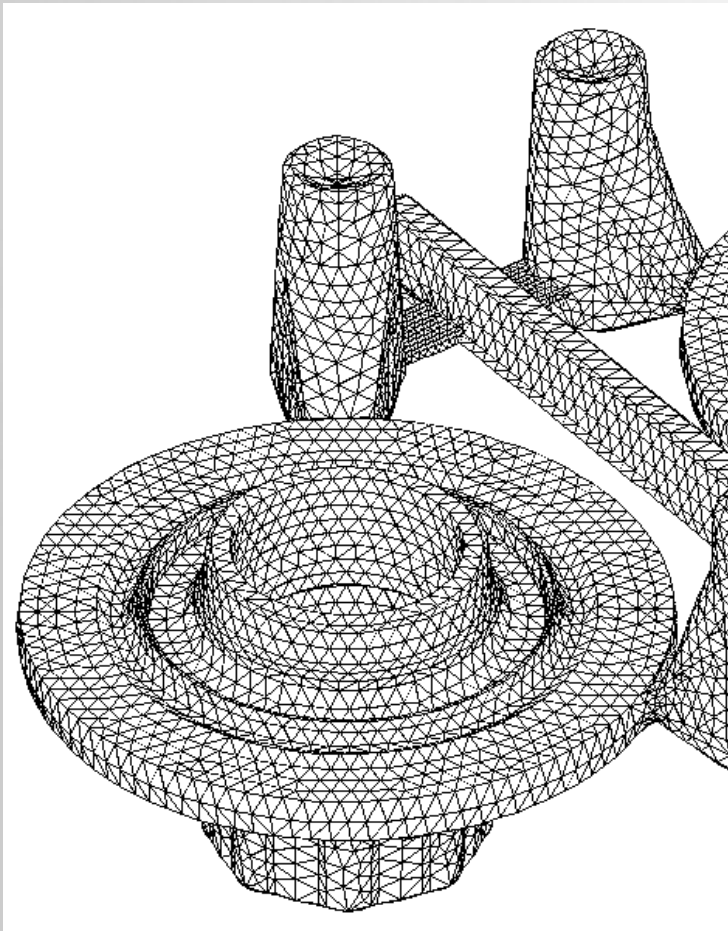


Finite Difference (FDM)

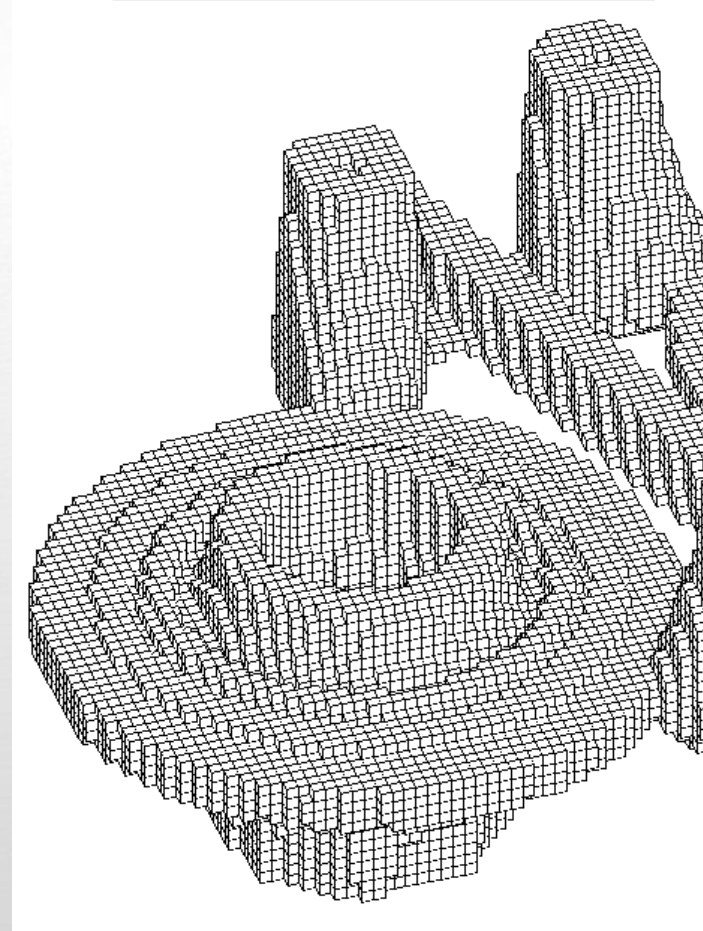


Finite Element Method (FEM) / Finite Difference Method (FDM)

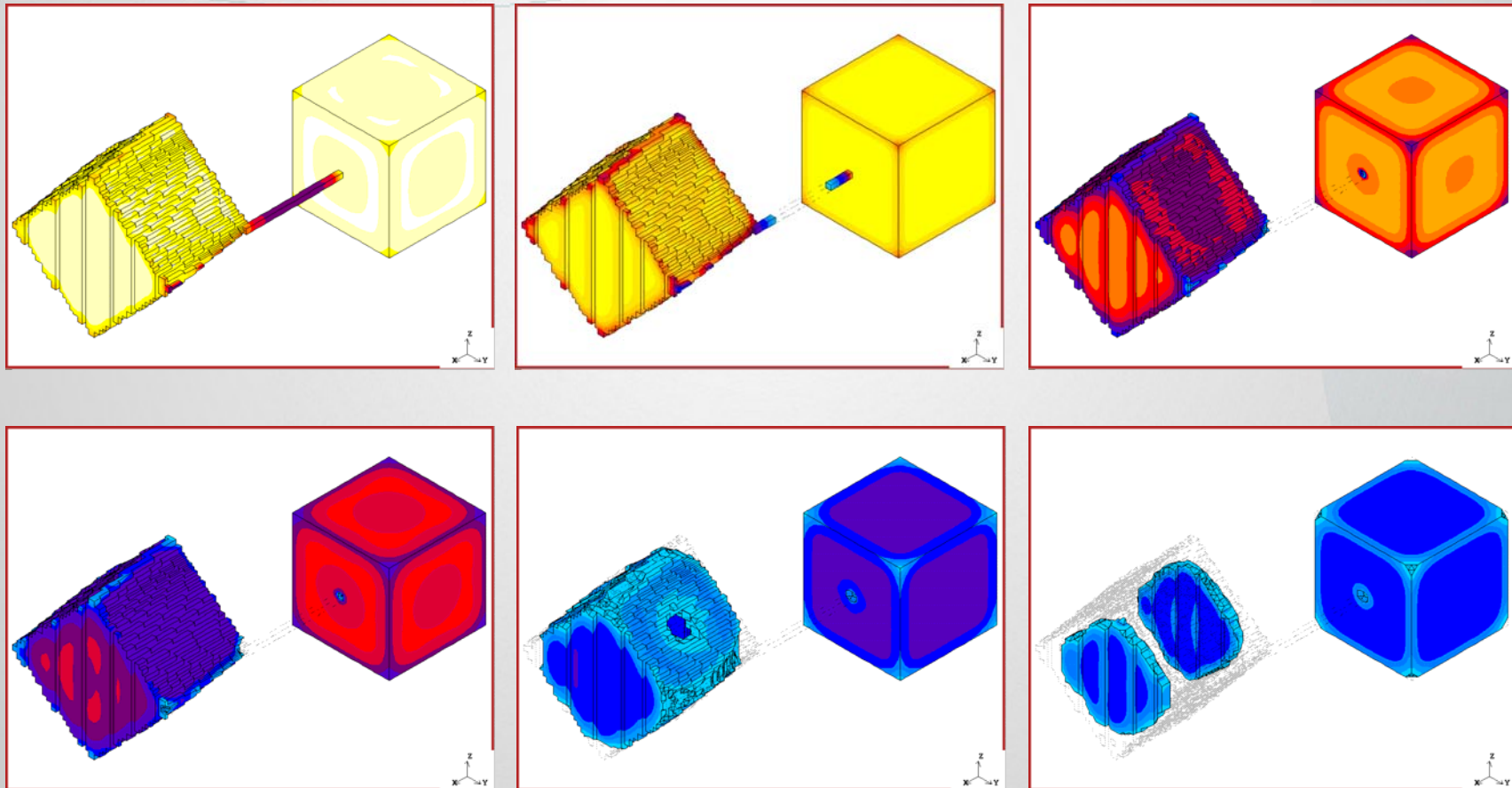
Finite Elements (FEM)

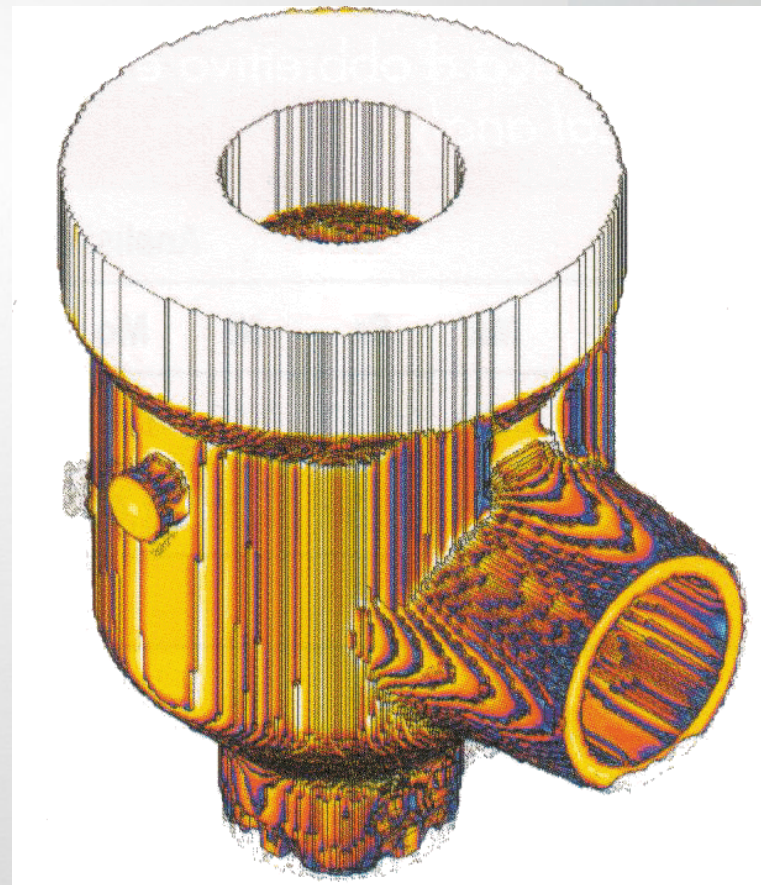
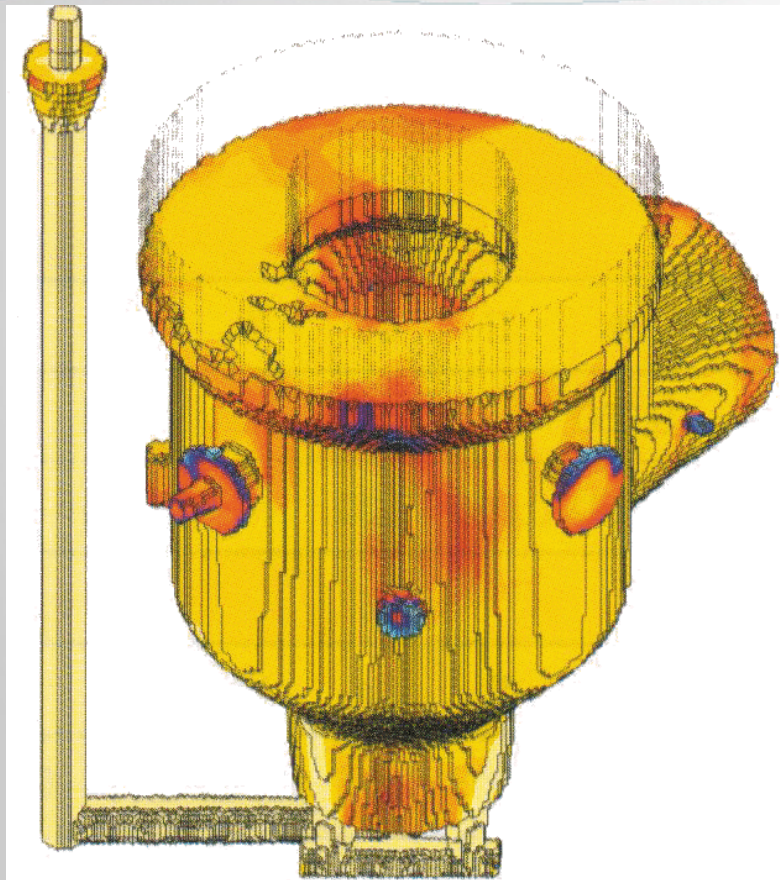


Finite Difference (FDM)

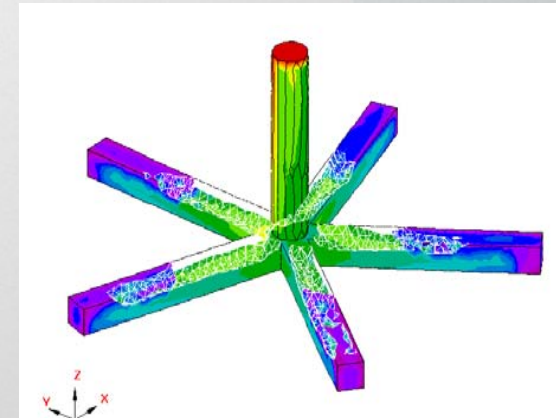
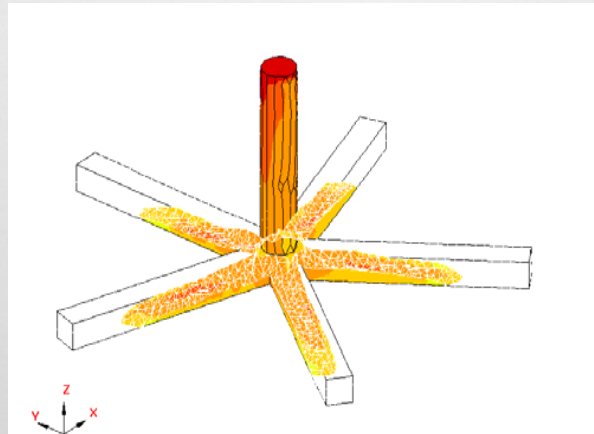
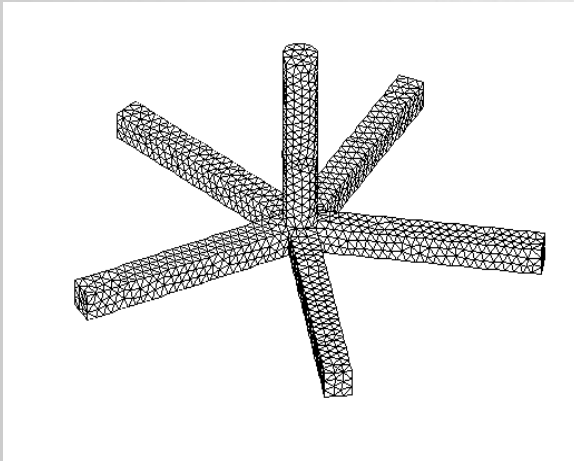
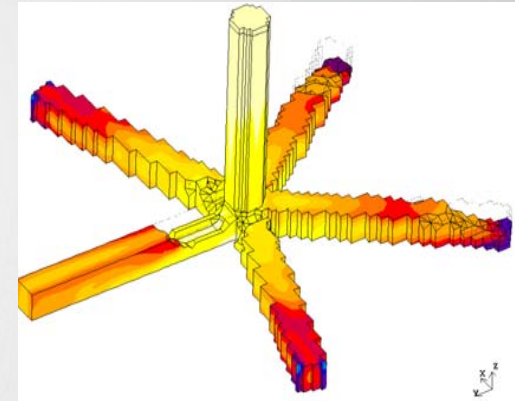
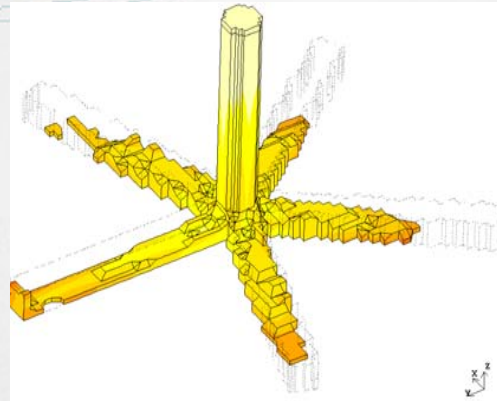
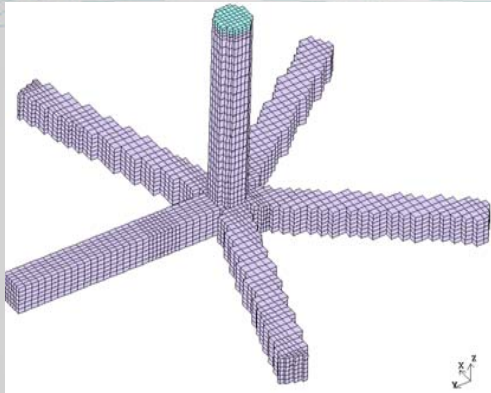


FDM



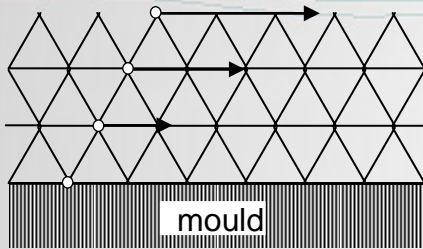


FEM versus FDM



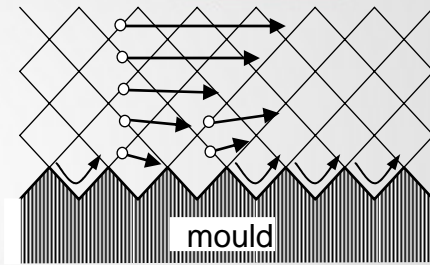
Comparisons between FEM and FDM

FEM

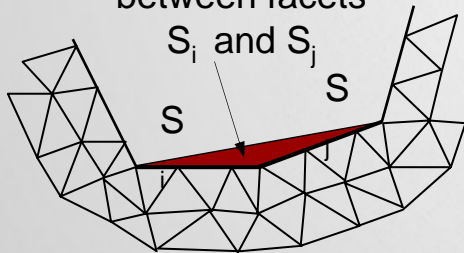


Fluid flow

FDM

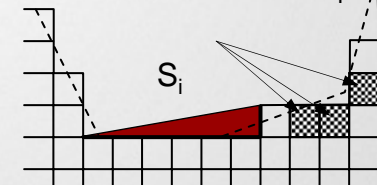


View angle
between facets
 S_i and S_j

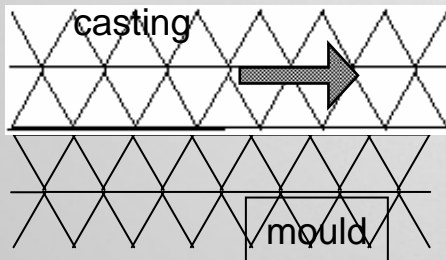


Radiation

Volumes of S_j not
seen by face S_i

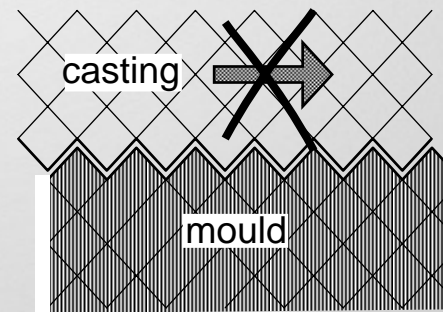


casting



Stress

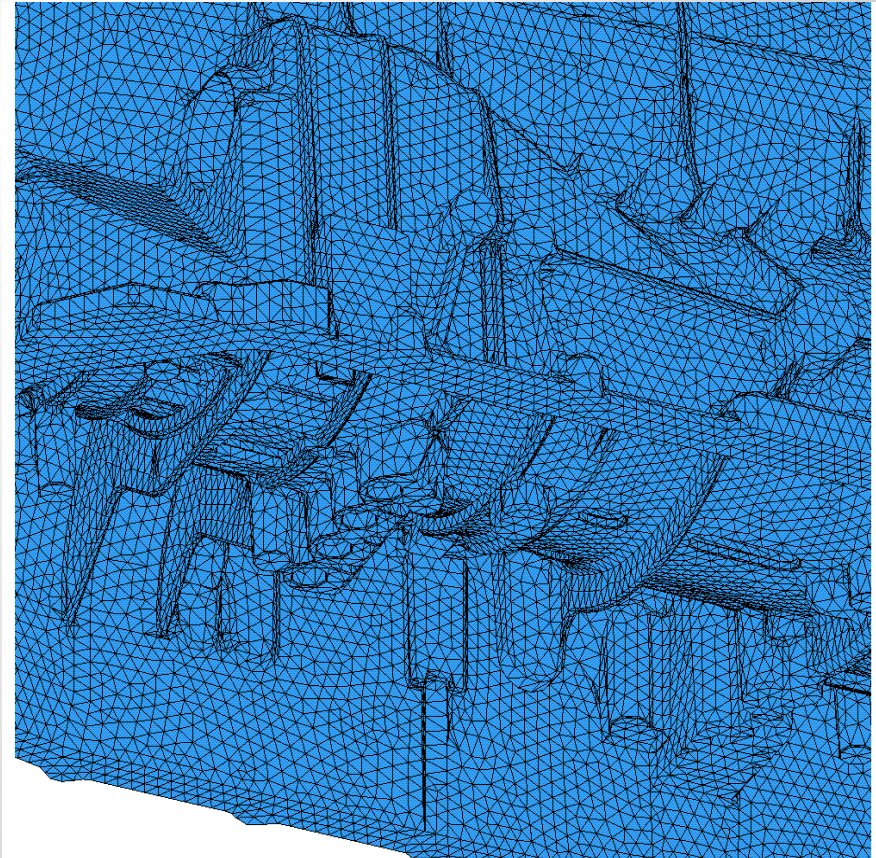
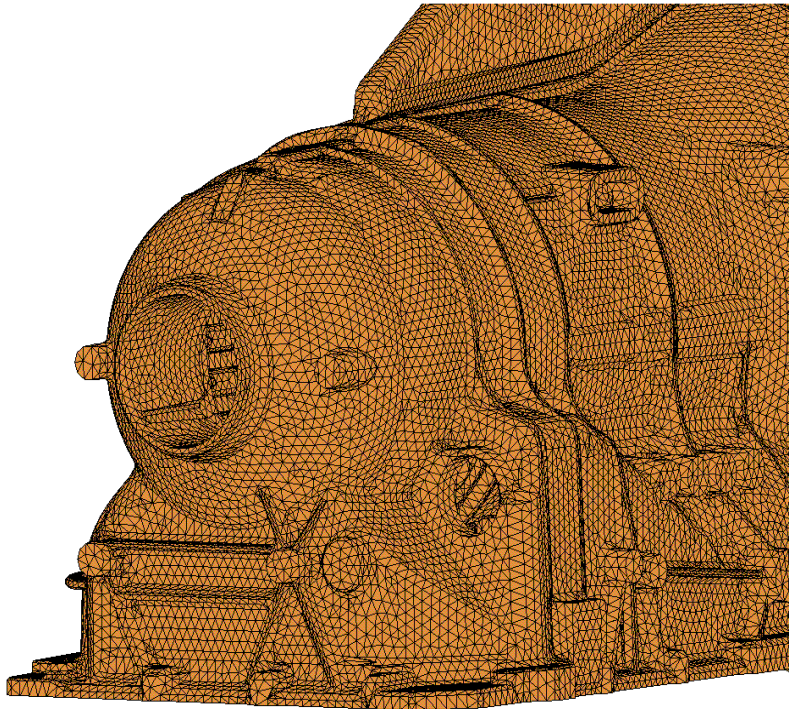
casting



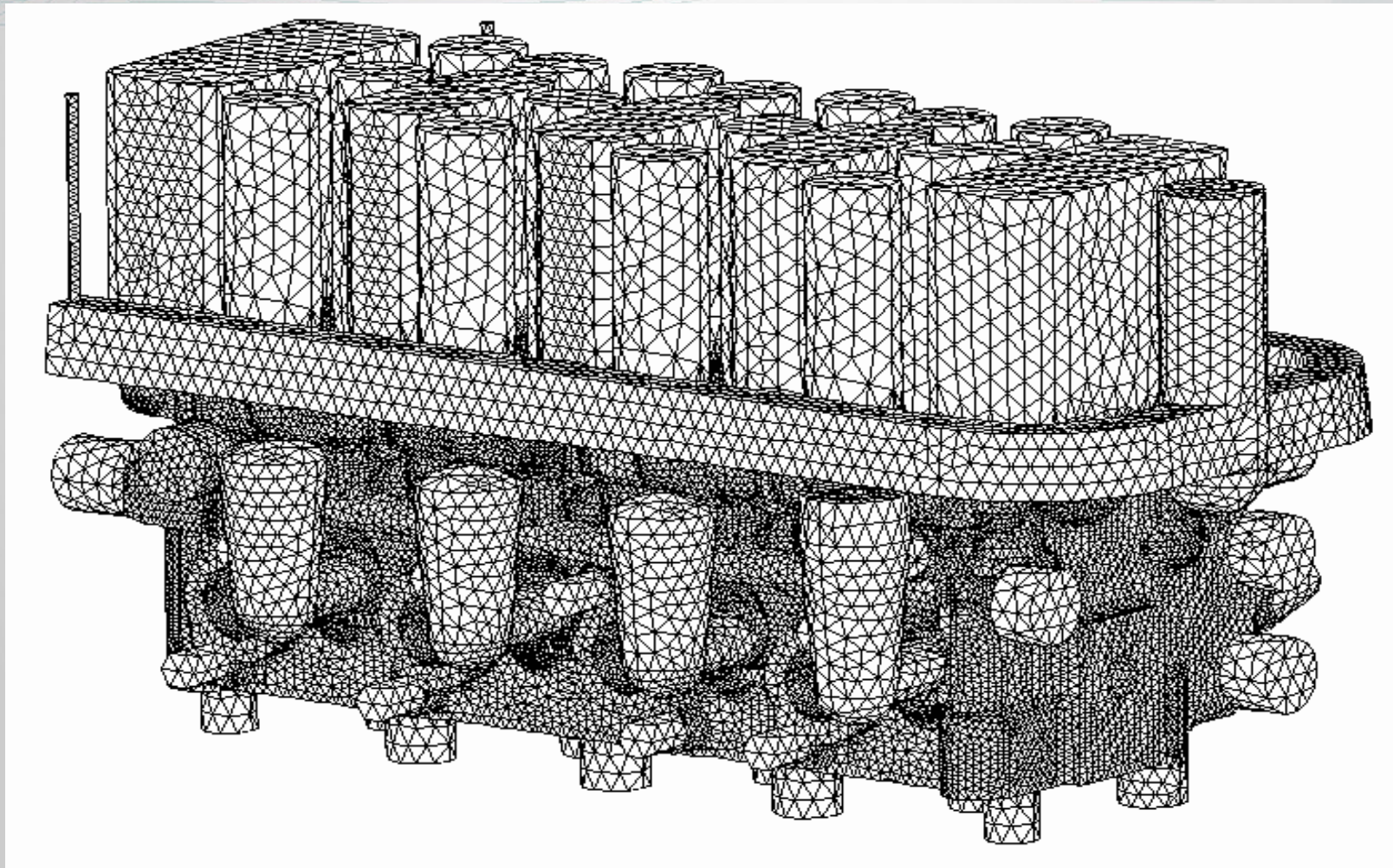
Sliding possible

No sliding possible

Complex geometry definition - FEM



Complex geometry definition - FEM



Complex geometry definition - FEM

FEM supports non-coincident meshes

