

Geo2Gmsh: A Scalable Workflow for Automated Mesh Generation of Geological Models Using Gmsh



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ABSTRACT

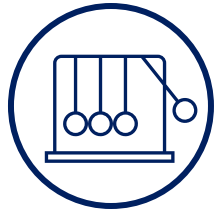
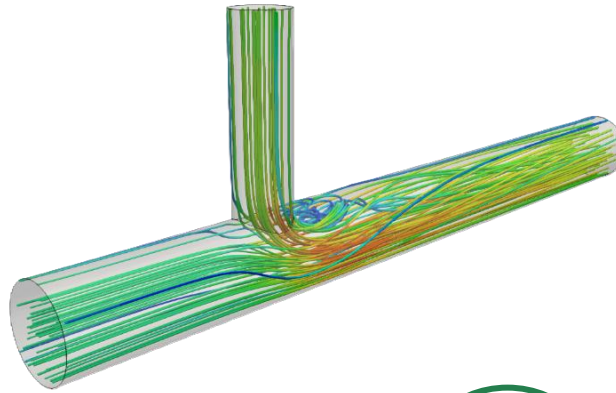


Scan to view online





Finite Element Method: Physics + Geometry

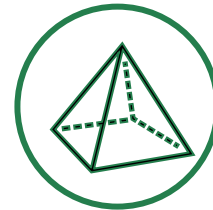


Physics

Solve governing equations

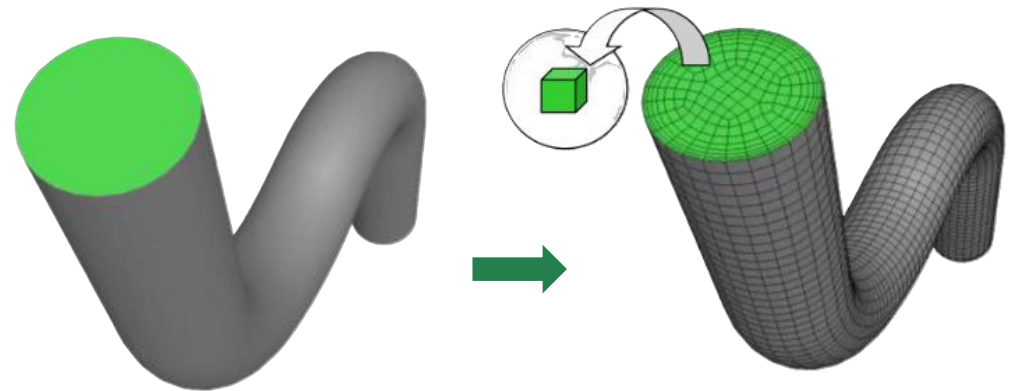
$$\rho C_p \left(\frac{\partial T}{\partial t} + \vec{v} \cdot \nabla T \right) = \nabla \cdot (k \nabla T)$$

$$\frac{\partial(\phi \rho_f)}{\partial t} = -\nabla \cdot (\rho_f \vec{v}_f)$$



Geometry

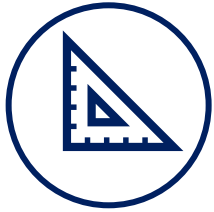
Domain discretization



FEM couples physics with spatial discretization

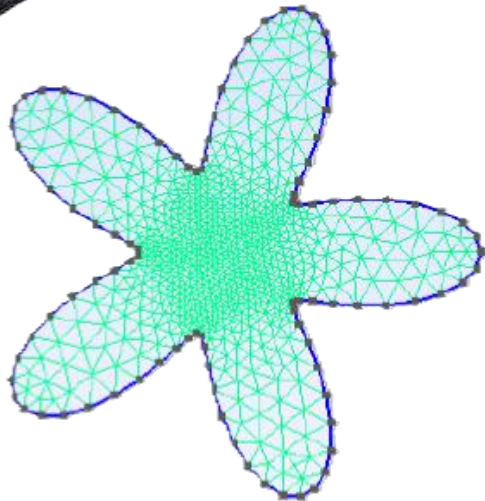
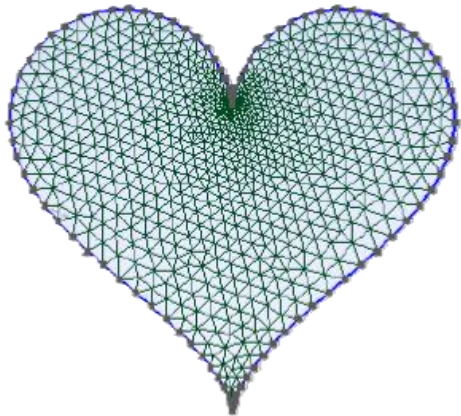
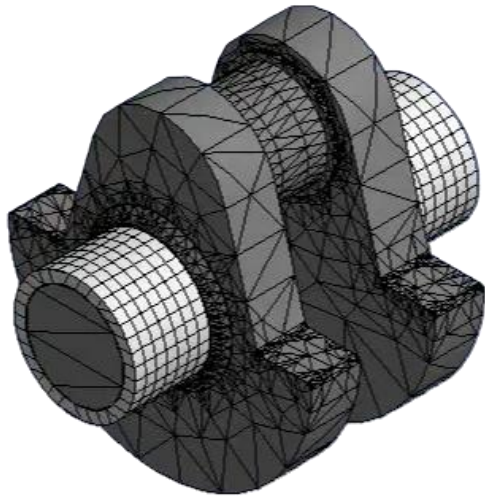


What is the problem?



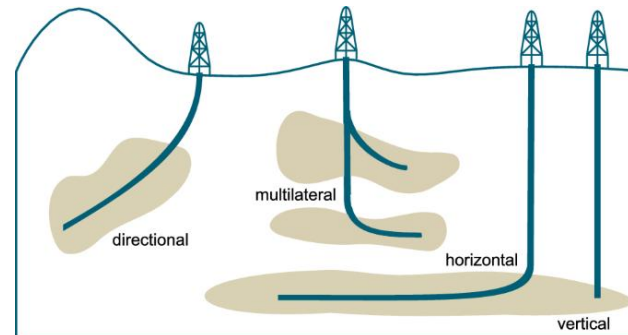
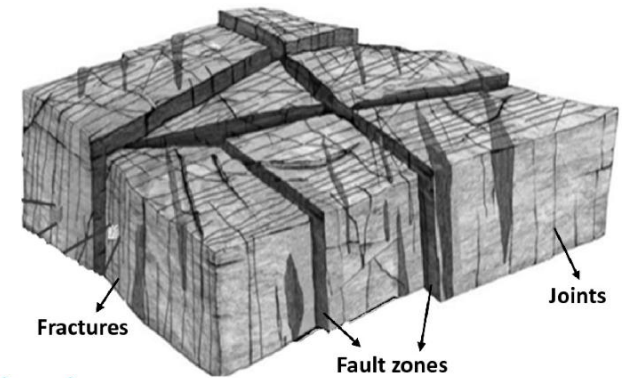
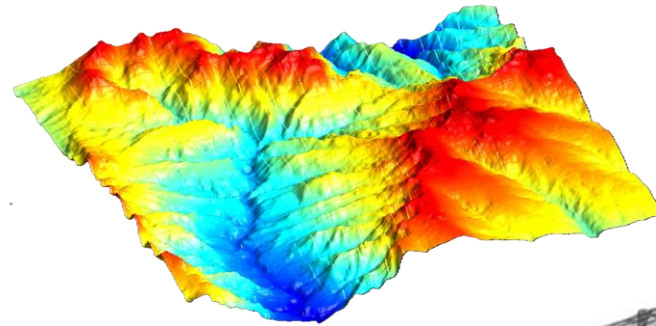
ENGINEERING

CAD-based, symmetric, parametric



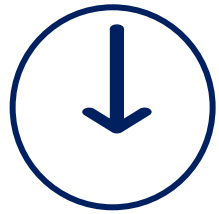
GEOSCIENCE

Irregular, heterogeneous, data-driven



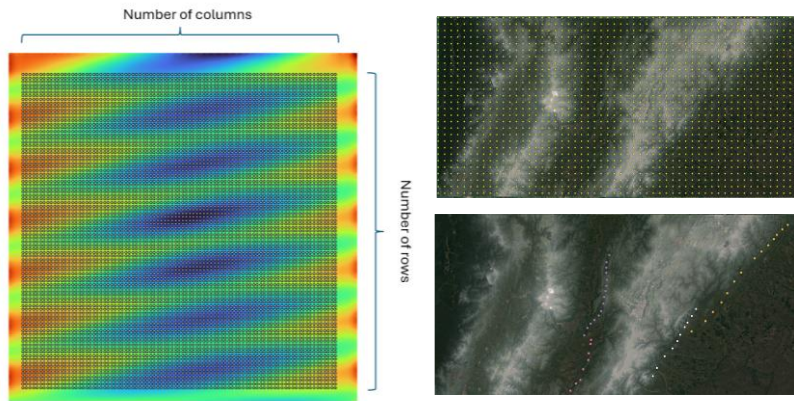


Our solution



INPUT

Detailed sampling of features



Save as txt file

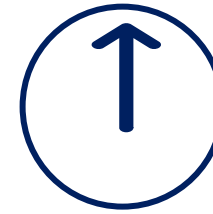
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2	3.160320641	3.062124248	1.006273848
3	3.258517034	3.062124248	0.991875861
4	3.356713427	3.062124248	0.976597975

Geo2Gmsh

Automated Mesh Generation



GitHub



OUTPUT

Reproducible, high-quality meshes

