CUBIT: 3-D Meshing with Nonplanar Surfaces

COMPUTATIONAL INFRASTRUCTURE for GEODYNAMICS

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Meshing Examples

- Examples are in the directory:
  - Binary:

  src/pylith/examples/meshing/surface_nurbs

  - Source tarball:

  src/examples/meshing/surface_nurbs

- There are README files in the top-level directory as well as the subdirectories.

Basic Steps for Creating Mesh

- Determine important structural features to include.
- Create surfaces that will help define geometry.
- Import surfaces into meshing package.
- Add any additional geometric features that are needed for discretization.
- Create mesh with desired refinement.
- Create element blocks and node sets.
- Export mesh.

How Do We Get Surfaces Into Cubit?

- Cubit's basic geometry engine is ACIS.
  - Geometry kernel used by many software packages (CAD, etc.).
- Surfaces are represented as NURBS surfaces.
  - Mathematical representation of a surface.
  - Surface intersections are easily computed.
- Easiest method is to get the surface definition into Cubit and let Cubit create the NURBS surface.

Possible Information Used To Create Surfaces

- Elevation contours (e.g., subduction zone interface).

- Gridded data (e.g., DEM).

- Triangulated surfaces (e.g., SCEC Community Fault Model).