CUBIT: 3-D Meshing with Nonplanar Surfaces

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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).