7. Importing Geometry
Importing Geometry

Overview

- If the geometry of the part you want to analyze has already been created in a CAD package, it is generally more efficient to import it into ANSYS than to re-create it.

- In this chapter, we will discuss the various import options available in ANSYS:
  
  **A. IGES Imports** — expands on IGES importing, which was covered briefly in Chapter 4.
  
  **B. Connection Products** — shows how to import parts directly from certain CAD packages.
  
  **C. F.E. Model Imports** — briefly explains how to import nodes and elements.
  
  **D. Workshop** — a hands-on exercise on importing.
Importing Geometry

A. IGES Imports

- The general procedure to import an IGES file has already been discussed in Chapter 4. In this section, we will explore some of the options available:
  - the two methods, default and alternate
  - the Merge, Solid, and Small options
Importing Geometry

...IGES Imports

• **Default Method** — Imports and stores geometry in a special database that allows you to repair and defeature the model. \([\text{ioptn}, \text{iges}, \text{defa}]\)
  
  + Ability to defeature, i.e., to remove minor details such as protrusions, cavities, and small holes.
  
  – Because of the special database used to store geometry, only a limited number of solid model operations are available.
  
  – Generally requires more memory and is somewhat slower than alternate method.

Even though this method is currently the default, it is NOT recommended because its disadvantages outweigh the advantages.
Importing Geometry

...IGES Imports

- **Alternate Method** — Imports and stores geometry in the standard ANSYS database.  [ioptn,iges,alte]
  - Faster and more reliable than the default method.
  - Allows the full set of solid model operations.
  - No defeaturing tools are available.

This is the recommended method.
**Importing Geometry**

*...IGES Imports*

- **Merge Option**
  - ON by default, to merge coincident entities so that adjacent areas meet at a common line, and adjacent lines meet at a common keypoint.
  - Turn it OFF only if you are using the default method and your initial attempt runs out of memory.
  - ioptn,merge,on/off
Importing Geometry

...IGES Imports

• **Solid Option**
  - ON by default, to automatically create a volume (solid) after importing and merging.
  - Turn it OFF if you want to import surfaces only and create a shell or 2-D plane model.
  - ioptn,solid,on/off
**Importing Geometry**

**...IGES Imports**

- **Small Option**
  - ON by default, to automatically delete small, sliver-like areas that might be troublesome for meshing.
  - Available only for the "default" method.
  - Turn it OFF if you find gaps or “holes” in the model.
  - ioptn,small,on/off
Importing Geometry

B. Connection Products

- IGES importing works quite well, but because of the dual translation process — CAD → IGES → ANSYS — there are many cases where it does not work.

- ANSYS Connection products overcome this problem by directly reading the “native” part files produced by the CAD package:
  - Connection for Pro/ENGINEER (“Pro/E” for short)
  - Connection for Unigraphics (“UG” for short)
  - Connection for CADDS
  - Connection for SAT
  - Connection for Parasolid

- To use a connection product, you need to purchase the appropriate license.
Importing Geometry

...Connection Products

• Connection for Pro/E
  – Reads .prt file produced by Pro/ENGINEER (from Parametric Technology Corp.).
  – Requires Pro/ENGINEER software.
  – Utility Menu > File > Import > Pro/E...
  – Or ~proein
Importing Geometry

...Connection Products

- Connection for UG
  - Reads .prt file produced by Unigraphics (from Electronic Data Systems Corp.).
  - Requires Unigraphics software.
  - Utility Menu > File > Import > UG...
  - Or ~ugin
Importing Geometry

...Connection Products

• Connection for CADDS
  – Reads _pd file produced by CADDS (from Parametric Technology Corp.).
  – Does not require CADDS software.
  – Utility Menu > File > Import > CADDS...
  – Or ~caddsin
Importing Geometry

...Connection Products

• Connection for SAT
  – Reads .sat file produced by CAD packages that use the ACIS modeler.
  – Does not require ACIS software.
  – Utility Menu > File > Import > SAT...
  – Or ~satin
Importing Geometry

...Connection Products

- Connection for Parasolid
  - Reads .x_t or .xmt_txt file produced by CAD packages that use the Parasolid modeler.
  - Does not require Parasolid software.
  - Utility Menu > File > Import > PARA...
  - Or ~parain
In addition to solid model geometry, ANSYS can also import finite element model data (nodes and elements) from certain packages.

The most common approach is for the software vendor to “write out” the nodes and elements in a format that ANSYS can read (using NREAD and EREAD). This format is published in the ANSYS Programmer’s Manual.

Some software packages, such as FEMAP from Enterprise Software Products Inc., provide an interface that allows you to transfer more than just nodes and elements.
Importing Geometry

D. Workshop

- Refer to your *Workshop Supplement* for instructions on:
  
  [W5. Importing Geometry](#)