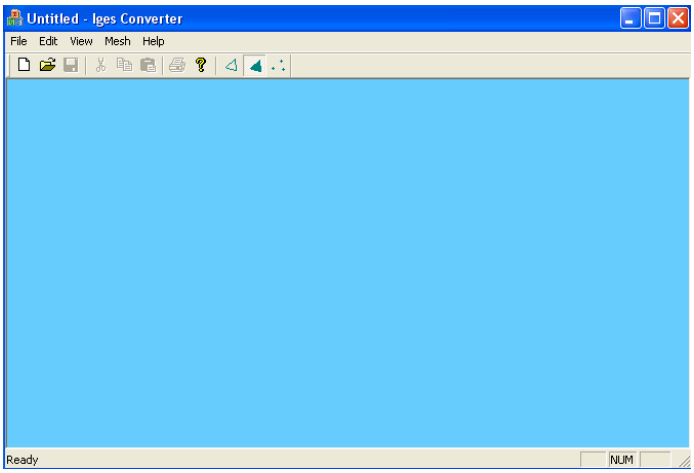
IGES to STL Converter
User Guide

This program converts IGES files to STL files. The main requirement for the IGES files is that they be saved as “Trimmed Surfaces”. Most CAD exporters have this option in their Export File options. It is recommended that the surfaces be saved as type NURBS.

The program works by converting the surfaces in the IGES file, which are parametric, into a mesh of polygons. Because of this, the STL file we save we’ll be an approximation of the “ideal” parametric definition. We’ll see later on that we have some options at our disposal to determine how close we get to this definition, although the closer we get the more polygons are required, and the bigger the end file.

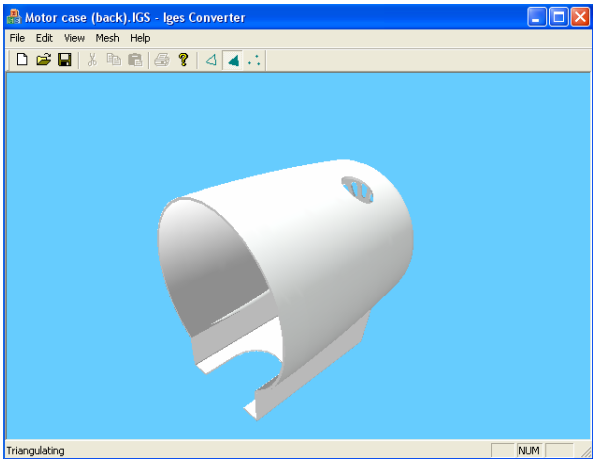
When opening the IGES Converter the following screen is presented:



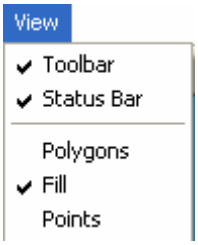
First we need to open the IGES file we want to convert. This can be done in several ways:

1- Go to File Menu → Open
2- Click on the “Open File” icon in the toolbar
3- Drag and drop an IGES file into the display area

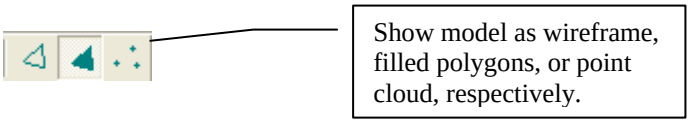
We’ll now see the model in the screen:



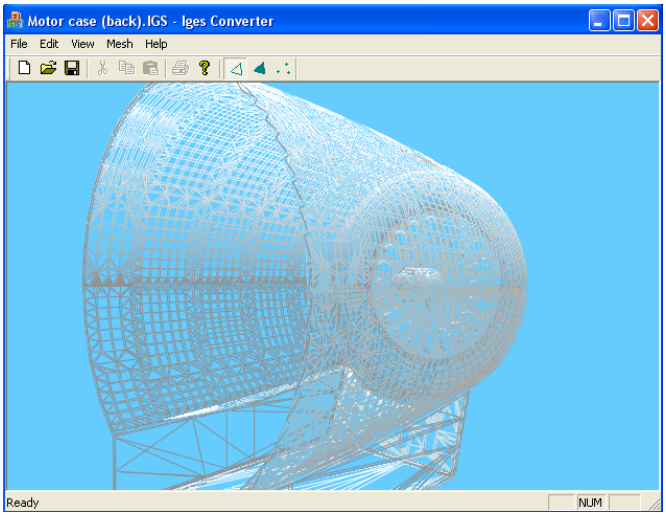
We can change how the model is presented in the view menu:



Or in the toolbar:



For example, this is a picture of the previous shown model as a wireframe:



To change the view of the model, press any of the following mouse buttons while dragging the mouse:

Left Click – Rotates the model

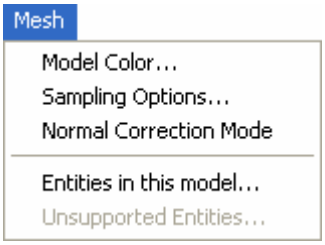
Right Click – Zooms in/out of the model

Left + Right Click – Translates the model around the screen

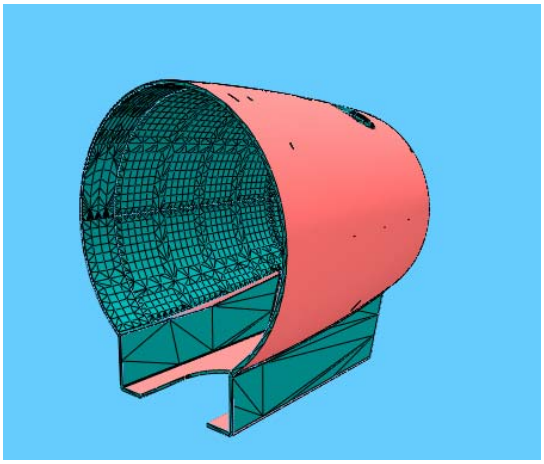
At this point we can already select the “Save As” option in the File menu, or the “Save” icon on the toolbar and select a name for the STL file. After saving the file we get a screen like this:

But many times we’ll need to make corrections on the model, or select a different sampling method and tolerance, factors which affect the overall quality of the model.

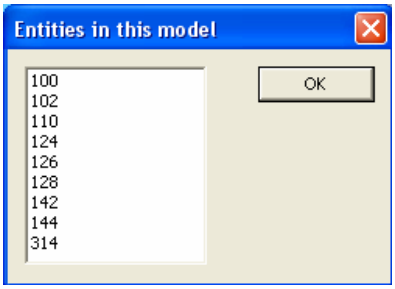
The Mesh menu contains the following options:



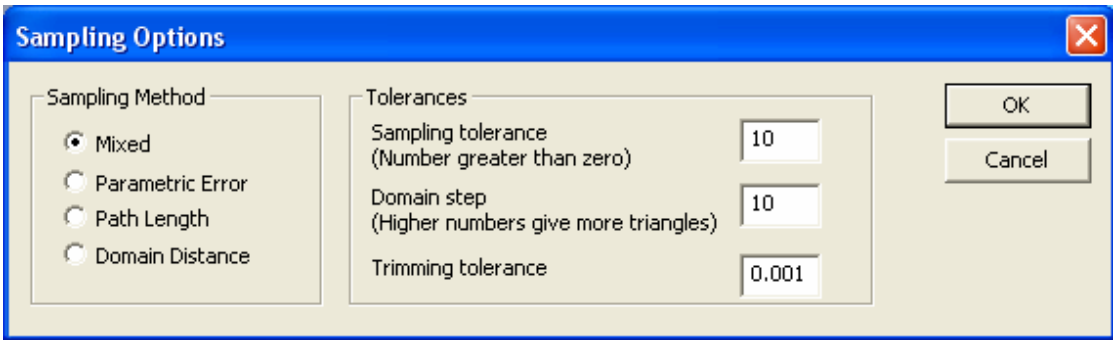
- Model Color: opens a Color Selection dialog box which lets you change the color in which the model is drawn.
- Sampling Options: opens a dialog which lets you select the tolerance levels and the sampling method used in the tessellation. More on this later.
- Normal Correction Mode: Sometimes the IGES file can include surfaces that were saved in the inverse order (i.e. with their back face facing out). This mode changes the drawing mode into filled polygons mode, while also drawing the back faces with wireframe on top and inverted color. This makes the back faces stand out more and easier to see. You can then tag each inverted surface by double clicking on them, and the program will invert their order when saving the file.



- Entities in this model displays: a list of the IGES entity numbers that are used in the opened model.
- Unsupported entities: Shows the IGES entity numbers that are in the file but are unsupported.



The Sampling Options opens the following dialog:



- The Parametric Error method determines how far the mesh will be from the ideal surface, where how far is determined by the Sampling Tolerance. This method usually yields the least amount of triangles, and is best for plane surfaces, since it minimizes the amount of irrelevant data.
- The Path Length method determines that the length of the lines composing the mesh will be no bigger than the Sampling Tolerance. This method uses more triangles, but gives better quality for rounded parts.
- The Domain Distance method determines that the number of pixels per unit length will be the Domain Step. This method gives a more uniform quality throughout the model.
- The Mixed method uses a combination of “Parametric Error” for surfaces of degree one (planar), and “Path Length” for any other surface. This is a combination of the strong points of each method.

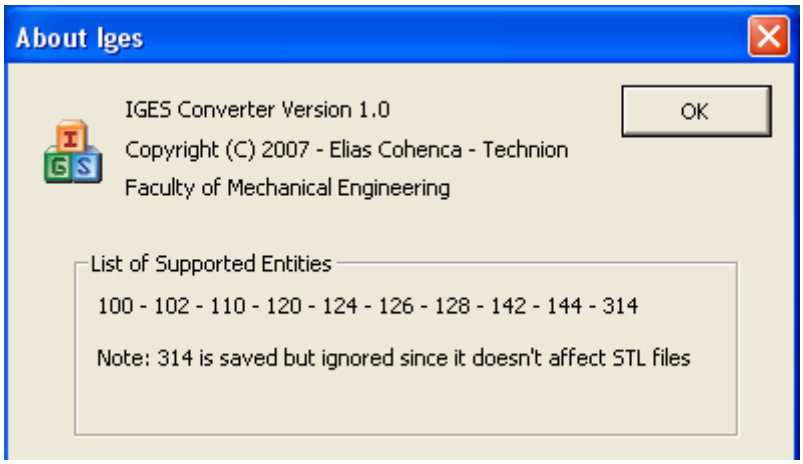
Sampling tolerance affects the tolerance of the first three methods: a smaller number will yield better quality, while using more triangles.

Domain step affects only the “Domain Distance” method. In this case, a higher number will yield better quality, since it means how many points per unit length we’ll be taking.

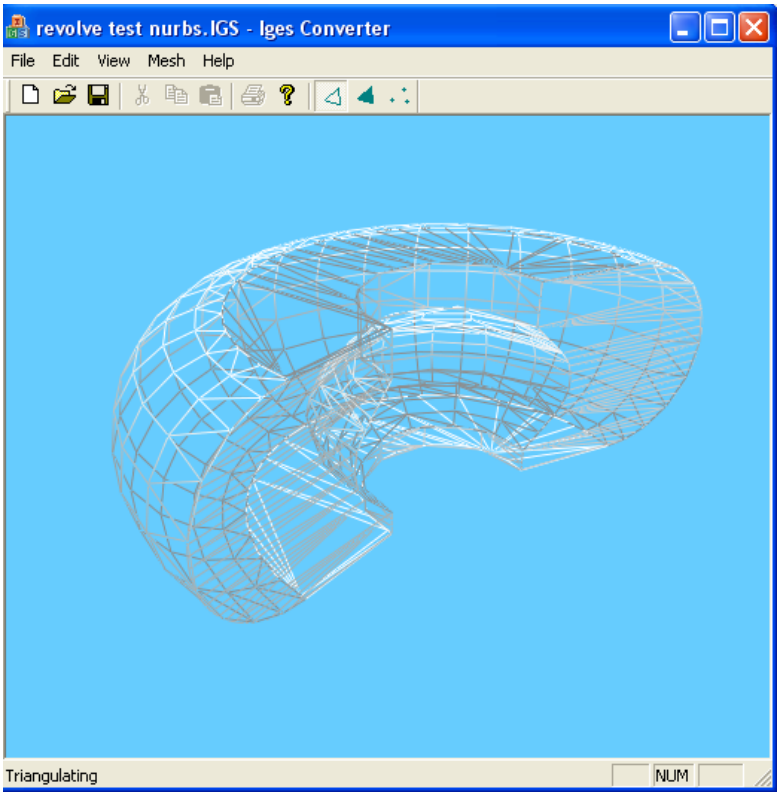
Another problem present in some IGES files is that the end points of the lines that define the contours of a surface are not connected completely. Trimming tolerance affects the trimming line correction method. If the end points of the trimming lines are separated by a distance smaller than this

tolerance, then they will be joined. Otherwise a line will be added between them. We could have just added a line between every point, but when the distance between the points is too close, we could get a situation when adding a line would cross over a previous line, creating an impossible situation for the trimming algorithm, which needs a simple closed loop.

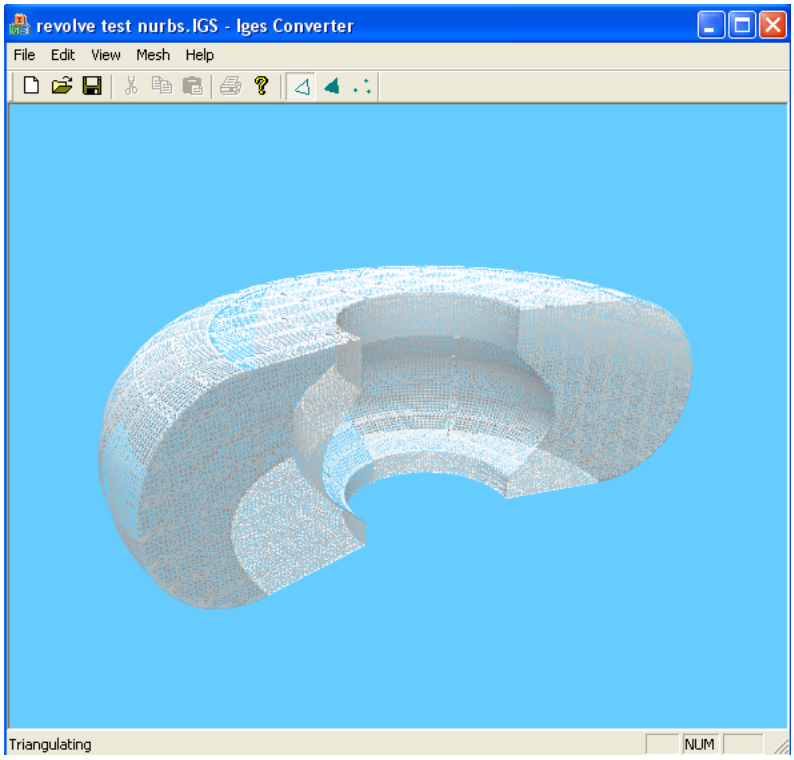
The About window displays the list of entity numbers supported by the program.



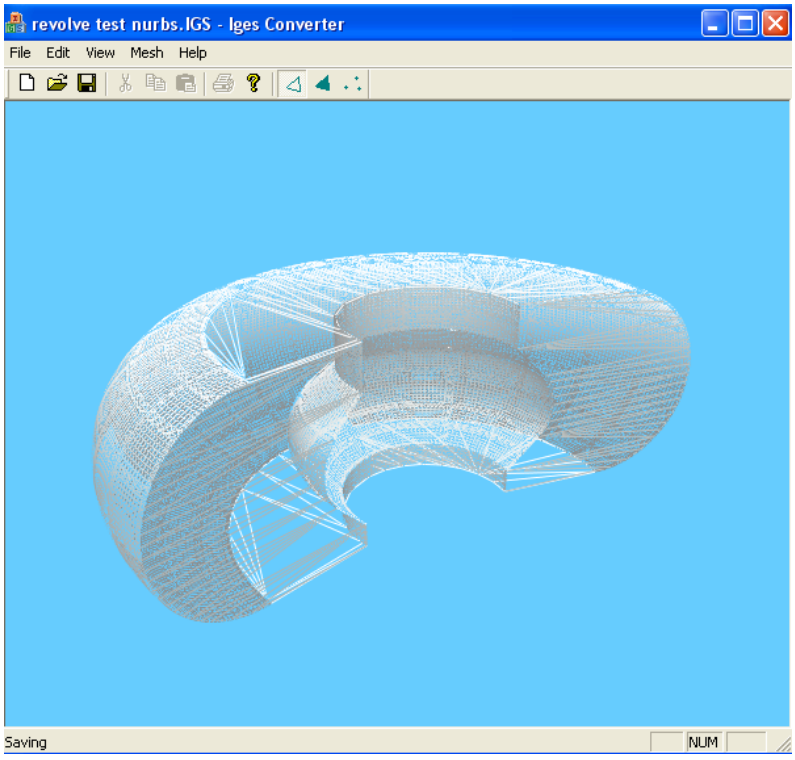
Here are some examples screens for comparison:



Parametric Error Method – Tolerance 5. Saved file: 739 Triangles



Same model as the previous one. Path Length Method – Tolerance 5.
Saved file: 67,333 Triangles



Same model as the previous one. Mixed Method – Tolerance 5.
Saved file: 44,139 Triangles
Notice how the flat area now has fewer triangles