Constructing a M{"o}bius strip

A M{"o}bius strip is a closed strip, both sides of which are a continuous surface. That is, if you start tracing one side of the strip, you will eventually come to the other side of the strip, and if you continue tracing its surface, you will return to the point at which you started your tracing.

There is no direct way to construct such a strip in (and any other modeler that we know of). However, it can be done by applying a few tricks, as follows:

1. Draw a circle and a little rectangle, as shown. The rectangle will be used as a source shape and the circle as a path for a sweep, but only after we break it to become an open path.
2. With the Line Edit tool and Break selected in its dialog, click on point 1. The circle is now an open shape.
3. In the Sweep Along Path Options dialog select Axial Sweep, Rotate Source, and in the By field enter 180°. Then with the Sweep tool click on the rectangle and then on the circular path. The result should be as shown.

If you take a close look at the ends of the sweep, they do not line up exactly. You will both adjust them to line up and then connect the ends to transform the object into a closed strip. Zoom in to be able to view it better.

Next you want to stitch these two ends together, however, there is no direct way for stitching parts of the same object. To do it, you will first cut a piece of the object and then stitch the two objects together.

1. Delete the faces at the two ends of the sweep. Apply topological deletion (select Topology for Face in the Delete Options dialog).
2. With Snap to Point on and topological level set to Point, use the Move tool to relocate the points of one end onto the points of the other.
3. If you turn on the Show Directions option in the Wire Frame Options dialog, you will see arrows displayed at the ends, indicating that they are open.

The two M{"o}bius strips above were created using a planar (flat) circular path. The path can have any non-planar shape in 3D space, as illustrated below.

Note that another method for stitching the open ends of the same object would be to export the object in a format file such as 3DGF and then import it back with the Construct Solids option on.

The M{"o}bius strip you constructed makes one turn (180°). You can also construct strips that make more turns. Note however that the rotation angle you use when generating a sweep should always be a multiple of 180°, since the source at the end of the sweep should return to the same position it started at. A M{"o}bius strip generated by rotating the source of the sweep by 540° is shown below.