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Suggested Technique for Creating a Surface From Boundaries

Procedure

1. The following technique illustrates functionality for creating a surface from boundaries using both closed and open loop datum curves. This type of surface feature is created by referencing curves or edges that bound the model geometry and then blending a surface between those contours. (Note: In order to more easily follow this technique, features should be renamed so that they appear as in the following figures.)

This example demonstrates creating a surface between circular and elliptical curves in one direction, and planar curves in the other direction (Figure 1).

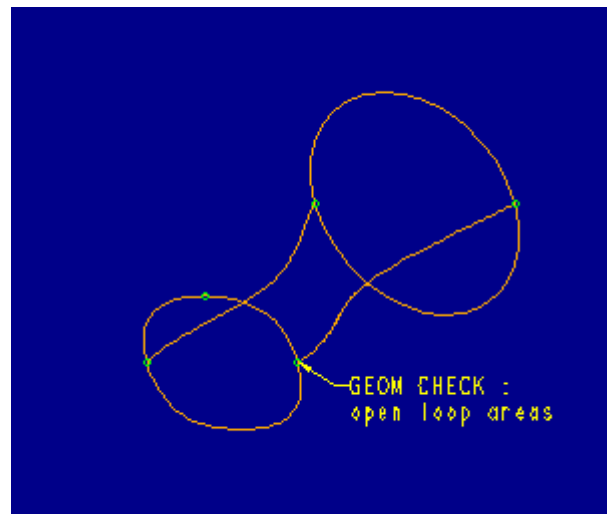


Figure 1

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2. The two closed loop boundaries must be broken into segments corresponding to the two open loop curves. These curves will then be used to create two individual surfaces. To break the closed loop curves into separate features that can be referenced during surface creation, the circular curve must be split and the elliptical curve must be used for creating two composite curves. Note: the "split" curves can also be achieved by using the selection **Chain** in combination with the **Trim/Extend** functionality at the time of surface creation.

If the curves were not split into separate entities and the closed and open looped curves were selected, the surface would fail with the message that the "boundary curves do not form a closed loop."

The circular curve can be split by selecting the **Datum Curve Icon, Split** and selecting the two planar curves as references to break up this sketched curve. The elliptical curve must be used to create 2 composite curves. Select the **Datum Curve Icon, Composite** and select the top half with **One By One**. Then the second curve can be created using the bottom half in the same manner. These new features will be referenced later to create one boundary blend.

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3. This surface will be created as two separate features, and tangency needs to be preserved between them. To satisfy this condition, two surfaces need to be extruded from DTM2 so that they can be referenced for tangency when creating the boundary blend for the first portion of the model. These features should be created through **Feature, Create, Surface, New, Extrude, Done**. When in sketcher, use the **Use Edge Icon** to reference the planar curves. Note, this tangency condition can also be satisfied by selecting **Normal** during tangency specification.

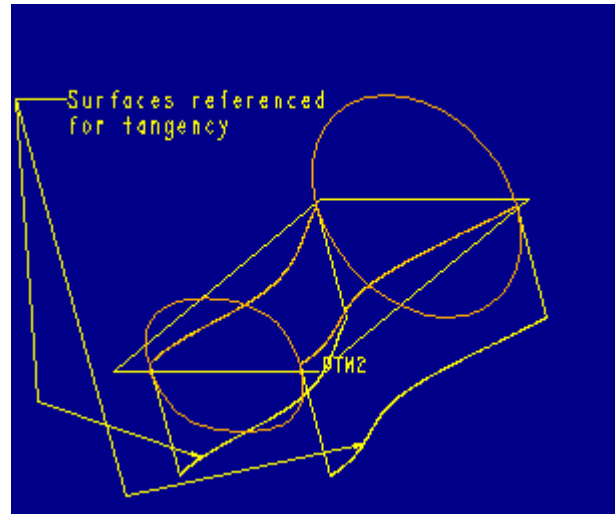


Figure 2

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4. The first boundary blend can be created using the two planar curves for one direction (3 and 4 from Figure 3) and the split circular curve (1 from Figure 4) and the composite elliptical curve (2 from Figure 3) for the other direction. Select **Feature, Create, Surface, New, Advanced, Done, Boundaries, Done, Blended Surf, Done**. Optional tangency will be defined from the dialog box after the curves are defined.

From the **First Dir** menu select curves 1 and 2 from Figure 3, then highlight **Second Dir**. Select curves 3 and 4 for the second direction and **Done Curves**.

To define tangency conditions, select **Boundary Cond** from the dialog box. From the BOUNDARY menu select the third boundary, **Boundary #3** and **Tangent** from the BNDRY COND menu. To explicitly define tangency to the extruded

surface, select **Ref Type** from the Boundary 31 dialog box and **Select** from the SELECT REFS menu. Then select the surface corresponding to the highlighted reference. This must be completed for each side (curves 3 & 4) in Figure 3.

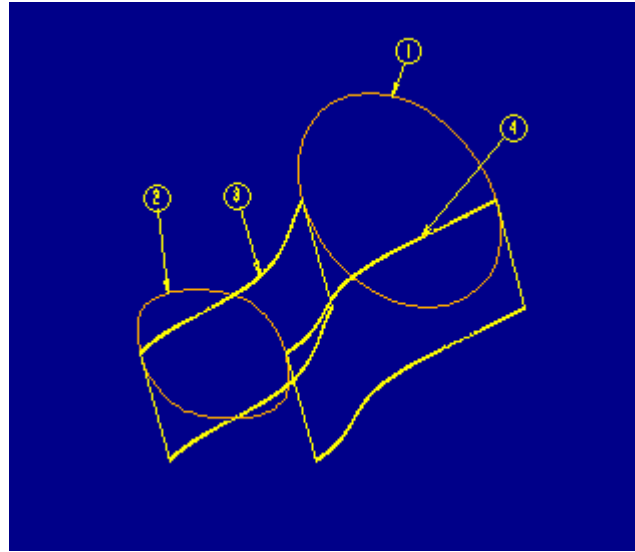


Figure 3

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5. A surface feature is created that is formed through the respective boundaries, covering the area defined by those boundaries, and tangent to the extruded surfaces created in Step 3 (Figure 4).

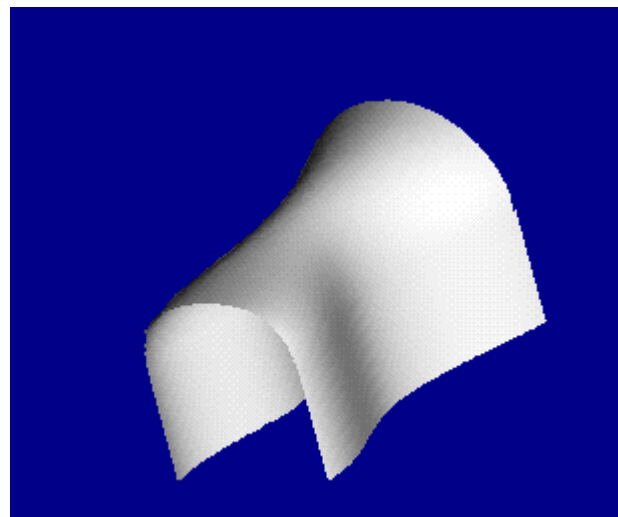


Figure 4

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6. With one portion of the surface created, the second half can be defined. The same procedure should be used as in Step 4. The other half of the circular curve and the other composite elliptical curve will now be referenced. This surface will also have tangency defined, but select the surface created in Step 4 (boundary blend) as the reference. (Figure 5)

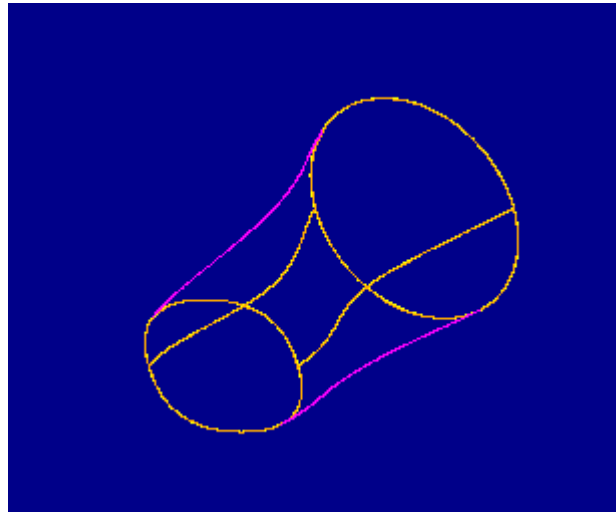


Figure 5

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7. The surfaces from Step 4 and Step 6 can now be merged into one uniform quilt with **Feature, Create, Surface, Merge, Join**. Additionally, the extruded surfaces from Step 2 can be added to a layer and blanked. (Figure 6)

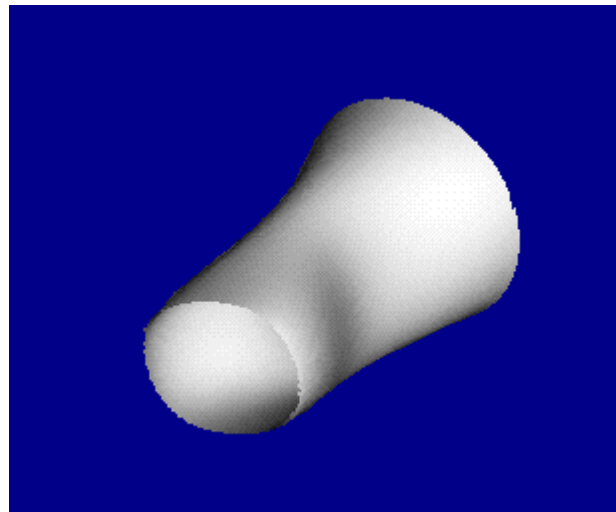


Figure 6

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