

Boundary Representation (B-Rep)

Validity Check Using Euler-Poincare Example

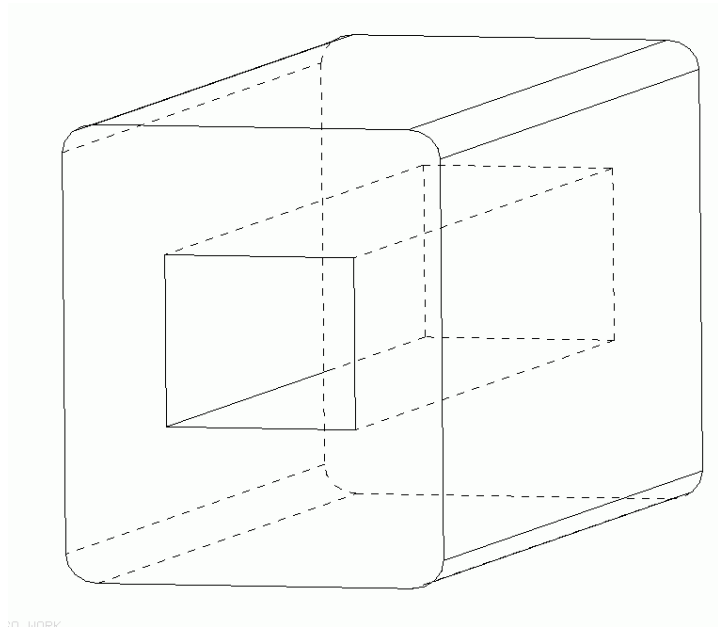
Given the boundary representation solid shown, verify the Euler-Poincare relationship.

The Euler equation provides an invariant relationship between the vertices, edges, and surfaces of a simple polyhedral object. The Euler-Poincare equation expands this relation to include objects with holes, passages, etc.

For the object at right:

Vertices	=	24
Edges	=	36
Faces	=	14

Make sure to look at ALL the faces that bound the volume, then find the bounding edges for those faces and finally the vertices associate with the edges. Check your count twice. Don't forget that the rounds require their own surface definitions.



Genus	=	1 (one through passage)
Shell	=	1 (no internal void)
(Hole) Loops	=	2

Solving the Euler-Poincare equation:

$$V - E + F - L = 2(S - G)$$

$$24 - 36 + 14 - 2 = 2(1 - 1)$$

$$0 = 0$$