Interference Analysis Interface Module (AIM) Manual

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0.1 Introduction

0.1.1 Interference AIM Overview

One can build and place components (Bodies) parametrically and if done correctly then no single Body penetrates another. This cannot always be accomplished, for example when a component is imported or the level of geometric complexity makes building in these constraints very difficult. Under these circumstances it is important to determine if the final placements of Bodies do not intersect.

This AIM takes a collection of Solid Bodies and returns the minimum distance found between Bodies (if not intersecting) or as a negative number, the penetration depth when the Bodies interfere. This is accomplished by using a discrete representation of the Bodies (using the EGADS tessellator) so the accuracy of the values returned is a function of how good of an approximation the tessellation is to the actual BRep.

An outline of the AIM's inputs and outputs are provided in AIM Inputs and AIM Outputs, respectively.

0.2 AIM Inputs

The following list outlines the Interference inputs along with their default value available through the AIM interface.

- **Attr_Name = "_name"**
  Attribute Name use to collect and label Bodies.
- **OML = True**
  Use the Body with the largest Bounding Box as a container (if True). False indicates that the Bodies are not contained.
- **Tess_Params = [0.025, 0.001, 15.0]**
  Body tessellation parameters used to discretize all Bodies. Tess_Params[0] and Tess_Params[1] get scaled by the bounding box of the largest body. (From the EGADS manual) A set of 3 parameters that drive the EDGE discretization and the FACE triangulation. The first is the maximum length of an EDGE segment or triangle side (in physical space). A zero is flag that allows for any length. The second is a curvature-based value that looks locally at the deviation between the centroid of the discrete object and the underlying geometry. Any deviation larger than the input value will cause the tessellation to be enhanced in those regions. The third is the maximum interior dihedral angle (in degrees) between triangle facets (or Edge segment tangents), note that a zero ignores this phase.

0.3 AIM Outputs

The following list outlines the Interference outputs available through the AIM interface.

- **Names** = A list of Attr_Name "value"s indicating the order of the Bodies found in the rest of the outputs.
- **Distances** = Distances. A symmetric NxN double array of returned distances. If it exists the OML can be found as a non-zero diagonal entry. All other diagonal entries are zero.
- **Volumes** = Volume.
- **Areas** = Surface Area.
- **CGs** = Center of Gravity (3 in length).
- **Inertias** = Inertial Matrix (9 in length).