Pointwise Analysis Interface Module (AIM)

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1 Introduction

1.1 Pointwise AIM Overview

A module in the Computational Aircraft Prototype Syntheses (CAPS) has been developed to interact with the .....

The Pointwise AIM provides the CAPS users with the ability to generate .....

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

The accepted and expected geometric representation and analysis intentions are detailed in Geometry Representation and Analysis Intent.

Details of the AIM's shareable data structures are outlined in AIM Shareable Data if connecting this AIM to other AIMs in a parent-child like manner.

Files output:

- capsInput.txt - Global glyph inputs set by CAPS
- caps.nmb - Pointwise nmb file generated

Pointwise attributes:

Key	Value	Geometry Location	Description
PW:Name		Face	Boundary name for domain or collection of domains.
PW:SurfaceCellType	$Triangle, $TriangleQuad	Face	Surface cell type. Global default is Triangle.
PW:SurfaceAlgorithm	$Delaunay, $AdvancingFront, $AdvancingFrontOrtho	Face	Surface meshing algorithm. Global default is Advancing↩ Front.
PW:WallSpacing	> 0.0	Face	Viscous normal spacing for T-Rex extrusion.
PW:QuiltName		Face	Name to give one or more quilts that are assembled into a single quilt. No angle test is performed.
PW:Baffle	$Baffle or $Intersect	Face	Either a true baffle surface or a surface intersected by a baffle

2 Geometry Representation and Analysis Intent

The geometric representation for the Pointwise AIM requires the body(ies) be either face body(ies) (FACEBO↩ DY), solid body(ies) (SOLIDBODY) or non- and manifold sheet body(ies) (SHEETBODY). Furthermore, the attribute capsIntent should be set to CFD and STRUCTURE analyses, or ALL.

3 AIM Inputs

The following list outlines the Pointwise options along with their default value available through the AIM interface.

- **Proj_Name = NULL**
  This corresponds to the output name of the mesh. If left NULL, the mesh is not written to a file.
- **Boundary_Decay = 0.75**
  Volumetric boundary decay.
- **Collision_Buffer = 1.0**
  Collision buffer for colliding fronts.
- **Connector_Initial_Dim = 11**
  Initial connector dimension.
- **Connector_Max_Dim = 512**
  Maximum connector dimension.
- **Connector_Min_Dim = 11**
  Minimum connector dimension.
- **Connector_Turn_Angle = 0.0**
  Maximum turning angle on connectors (0 - not used).
- **Connector_Split_Angle = 0.0**
  Turning angle on connectors to split (0 - not used).
- **Edge_Max_Growth_Rate = 1.3**
  Volumetric edge ratio.
- **Domain_Full_Layers = 0**
  Domain full layers (0 for multi-normals, $>=$ 1 for single normal).
- **Domain_Max_Layers = 10**
  Domain maximum layers.
- **Domain_Growth_Rate = 1.2**
  Domain maximum layers.
- **Domain_Growth_Rate = 1.2**
  Domain growth rate for extrusion.
- **Full_Layers = 1**
  Full layers (0 for multi-normals, $>=$ 1 for single normaln.
- **Max_Layers = 100**
  Maximum layers.
- **Growth_Rate = 1.2**
  Growth rate for boundary layer extrusion.
- **Proximity_Growth_Rate = 1.3**
  Connector proximity growth rate.

- **TRex_Prisms_Flag = False**
  Allow conversion to prisms.
- **IsoTriQuad_Flag = False**
  Allow triangles and quads in domains.
- **Volume_Initialize_Flag = True**
  Initialize block after setup.
- **Auto_Quilt_Flag = True**
  Automatically quilt faces that have the same geometric references.

4 AIM Shareable Data

The Pointwise AIM has the following shareable data types/values with its children AIMs if they are so inclined.

- **Body_Count**
  Example shareable data returned in $****$ format.

5 AIM Outputs

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

- **OutputVariable** = True if a ....., False if not.