curveTess Analysis Interface Module (AIM) Manual

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February 28, 2025

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0.1 Introduction

0.1.1 Curve Tessellation AIM Overview

This AIM provides the ability to elevate a triangular linear surfeace mesh to a high-order, "curved", surface meshes. The algorithm only inserts high-order vertexes on element interior and edges and ensures they are on the geometry. However, the original linear mesh vertexes are not modified. Hence, this algirthm is only suitable for isotropic meshes as the vertex insertion may produce negative Jacobian's for anisotpric elements.

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

0.1.2 Clearance Statement

This software has been cleared for public release.

0.2 AIM Inputs

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

- **Proj_Name = "curveTess_CAPS"**
  Output name prefix for meshes to be written in formats specified by Mesh_Format. These meshes are not linked to any analysis, but may be useful exploring meshing parameters.
- **Element_Order = 2**
  Polynomial order for the elevated elements.
  1 - liner
  2 - quadratic
  3 - qubic
  etc.

  - **Element_Class = 1**
    Class for the elevation for different Element_Order.
    (images from Exodus manual: https://sandialabs.github.io/seacas-docs/html/element_types.html)

Table 1 Element_Order = 1 - liner

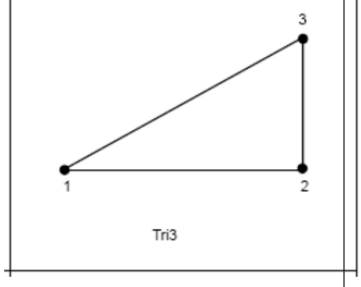
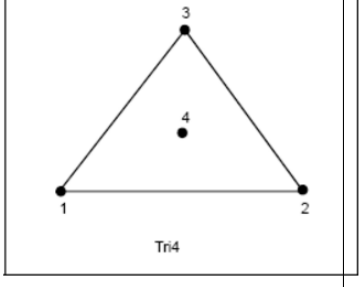
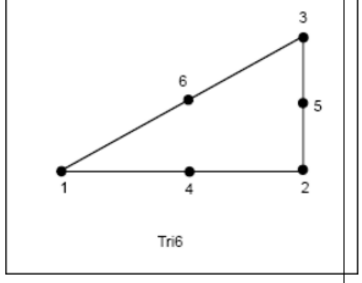
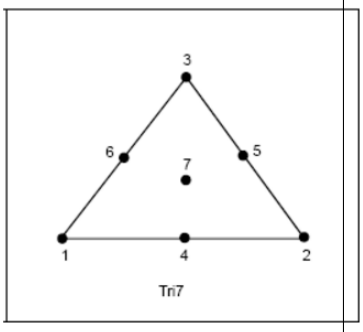
Element_Class = 1	Element_Class = 2
	

Table 2 Element_Order = 2 - quadratic

Element_Class = 1	Element_Class = 2
	

3 - qubic
etc.

- **inMesh_Quiet_Flag = False**
  Complete suppression of mesh generator (not including errors)

- **Mesh_Format = NULL**
  Optional list of string mesh formats to generate meshes not linked to analysis.
  Available format names include: "exodus", "fast", "wavefront", "libMeshb", "stl", "bstl", "su2", "tecplot", "ugrid", "vtk", and "bvtk".
  where the "b" prefix indicates binary version.

- **Mesh_Morph = False**
  Project previous surface mesh onto new geometry.

- **Mesh = NULL**
  A Surface_Mesh link.

0.3 AIM Outputs

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

- **NumberOfNode**
  Number of vertices in the surface mesh

- **NumberOfElement**
  Number of elements in the surface mesh

- **Surface_Mesh**
  The elevated surface mesh for a link