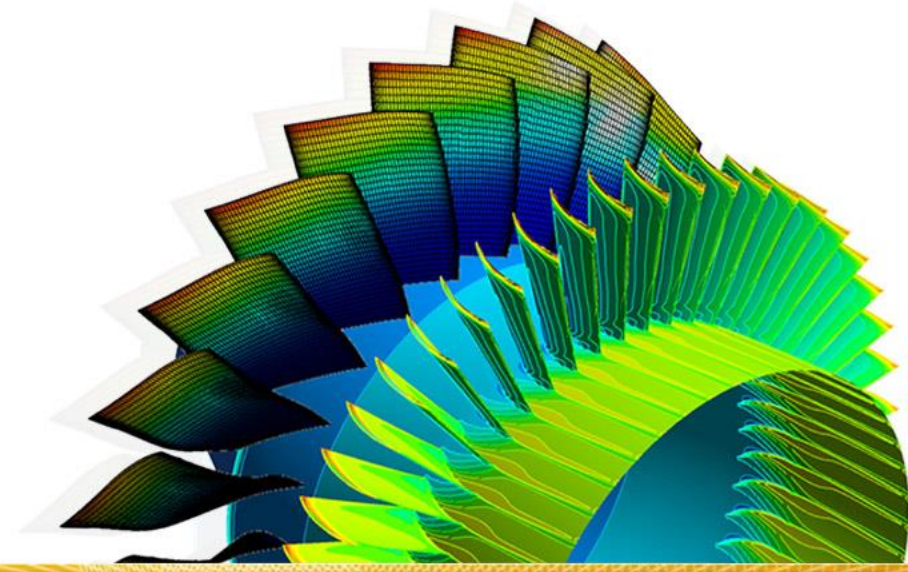
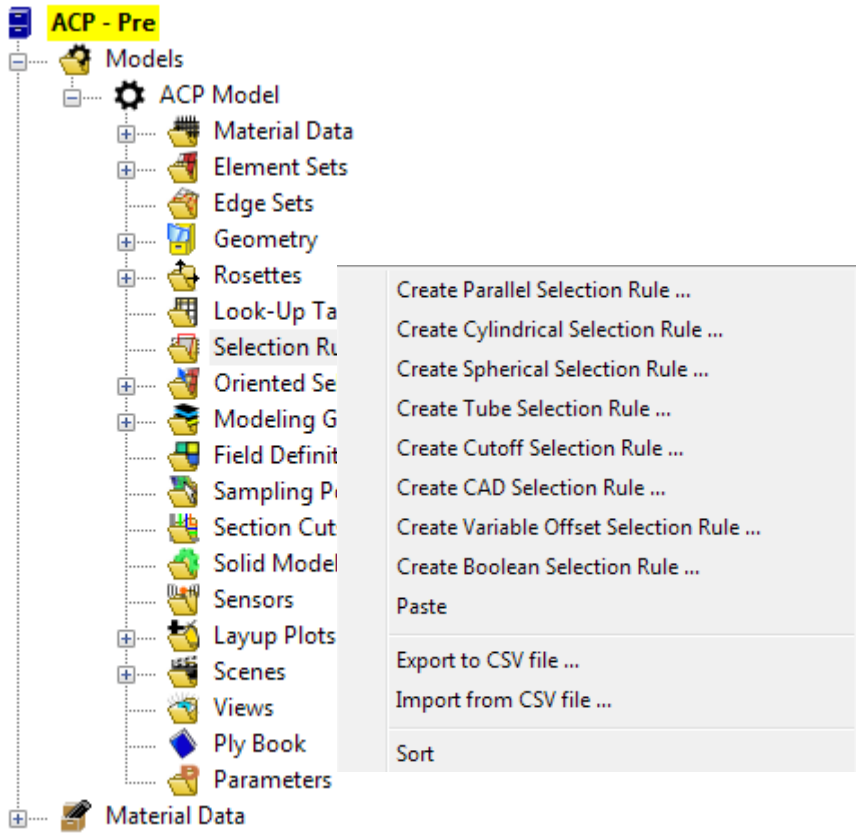
ANSYS Composite PrepPost 19.0

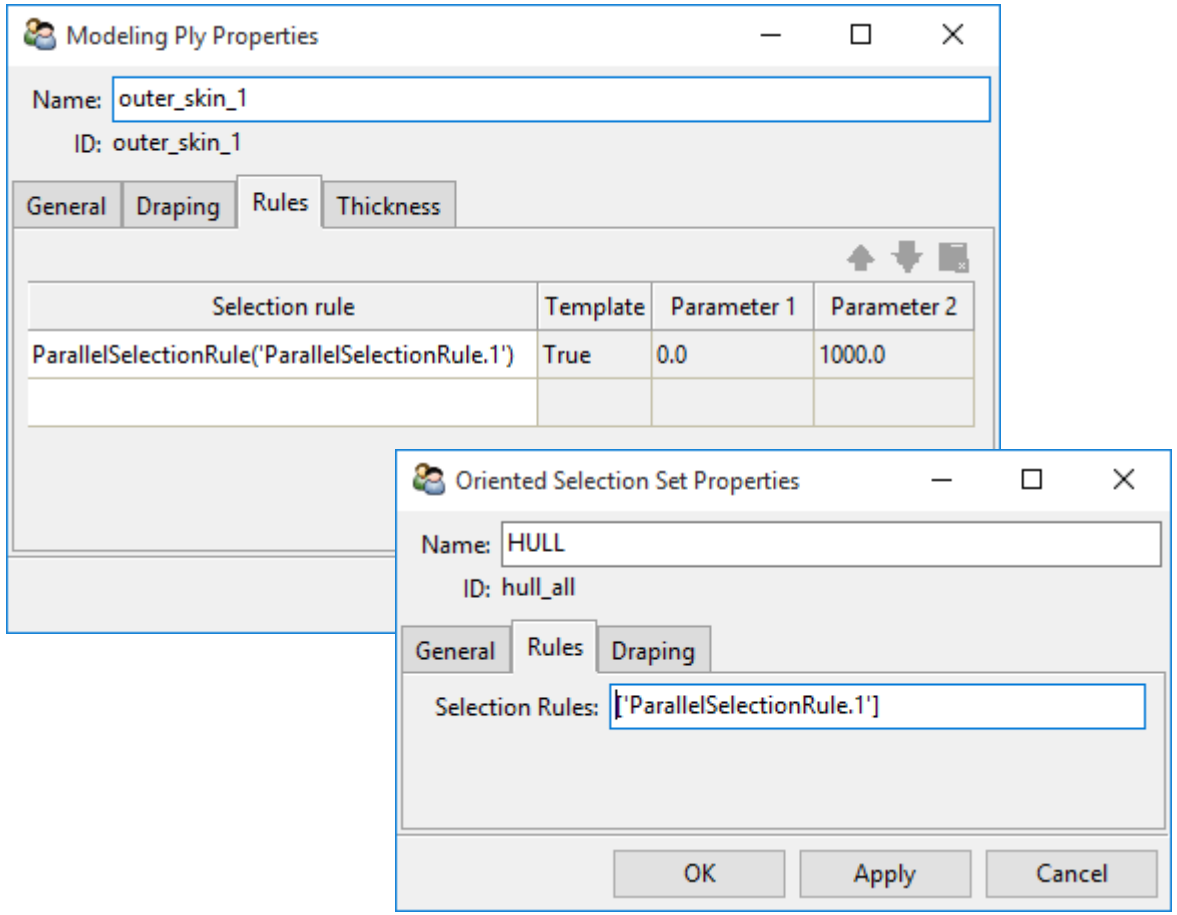
Module 5 : Rules and Edge Sets



5.1 Rules

- Selection Rules can be used to control the area coverage of plies.
- They can be applied to Modeling Plies as well as Oriented Selection Sets

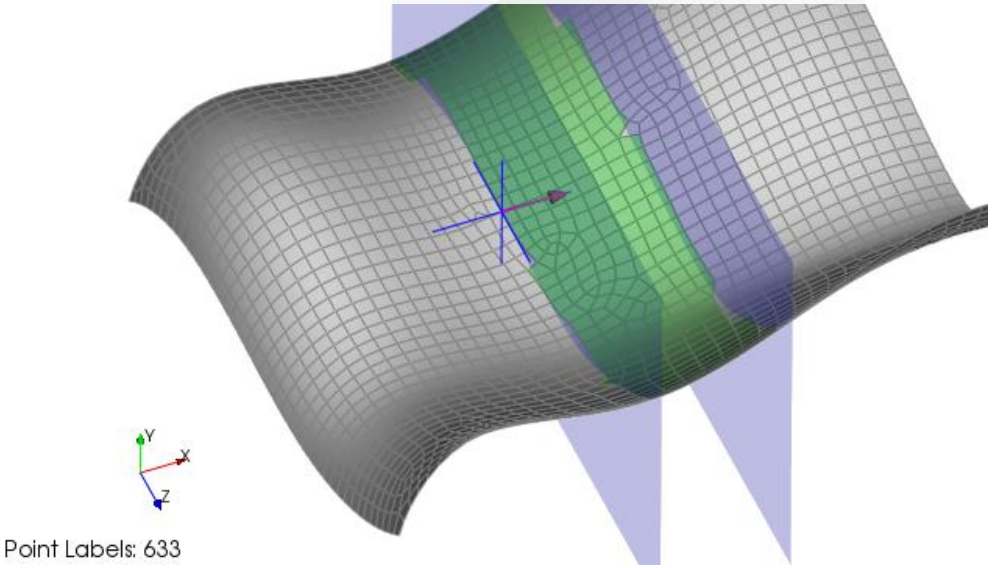


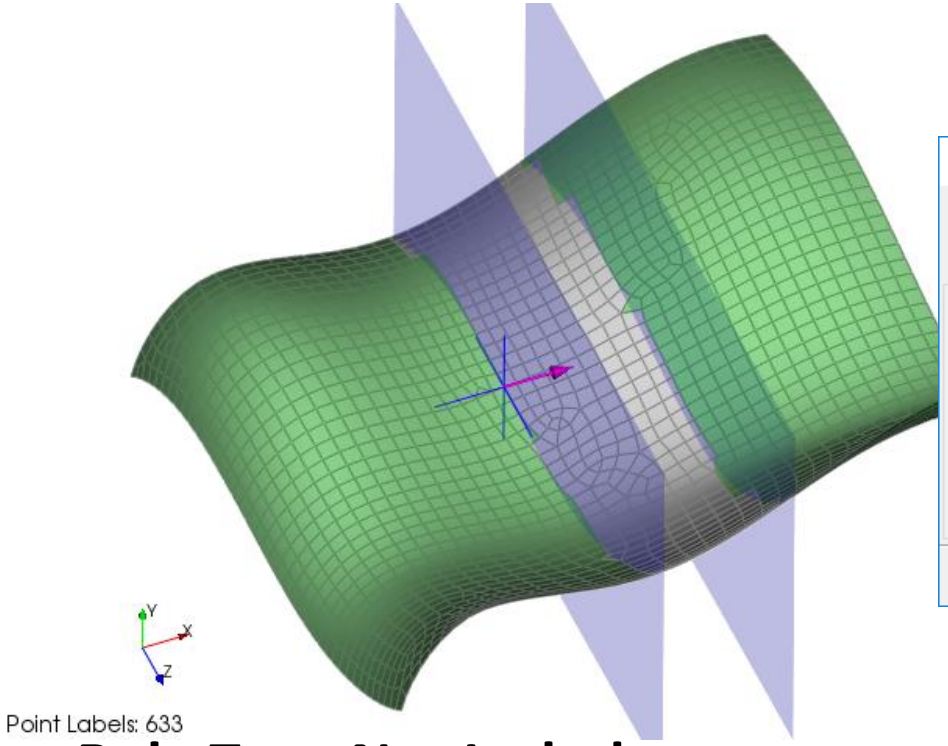


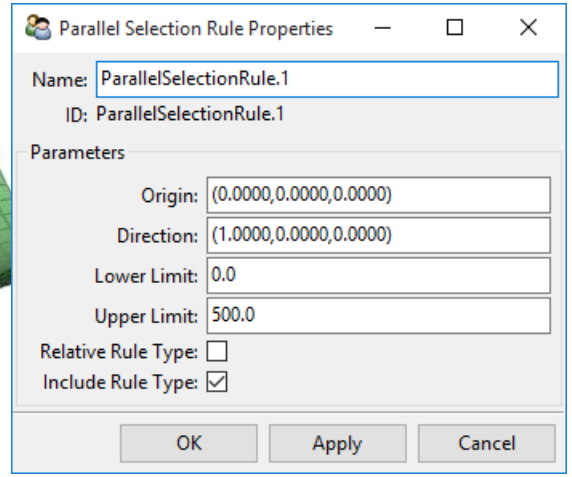
5.1 Rules

Rules can specify elements within the given boundaries or outside of the boundaries:

Parallel Rule







Rule Type Include

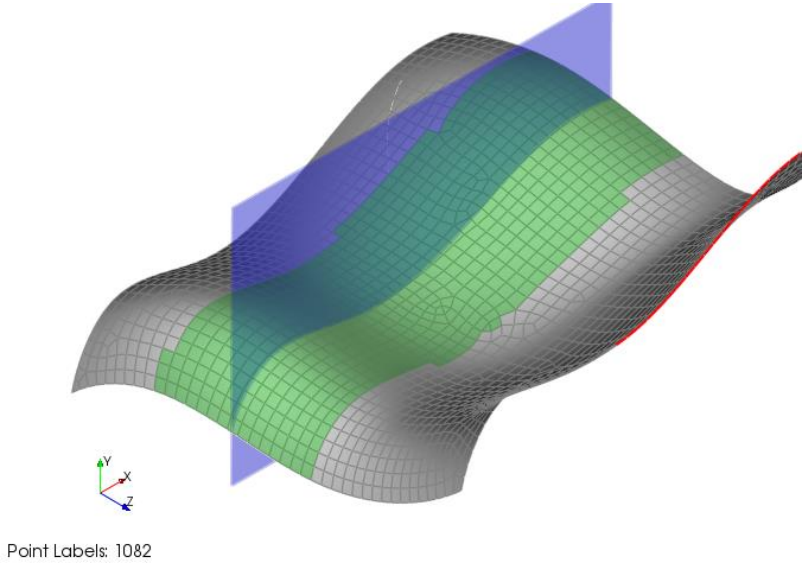
All Elements within the boundaries are selected.

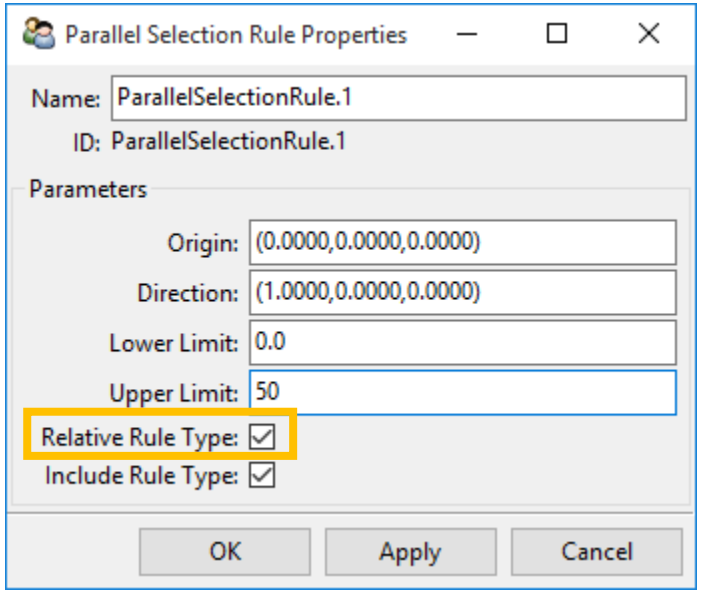
Rule Type Not Include

Is Include not selected all element outside the boundaries are selected.

5.1 Rules

- Boundaries can be defined relative to the size of the model.
- The defined values are specified as percentage of the outer dimensions of the model.
- Rules grow and shrink with the model.



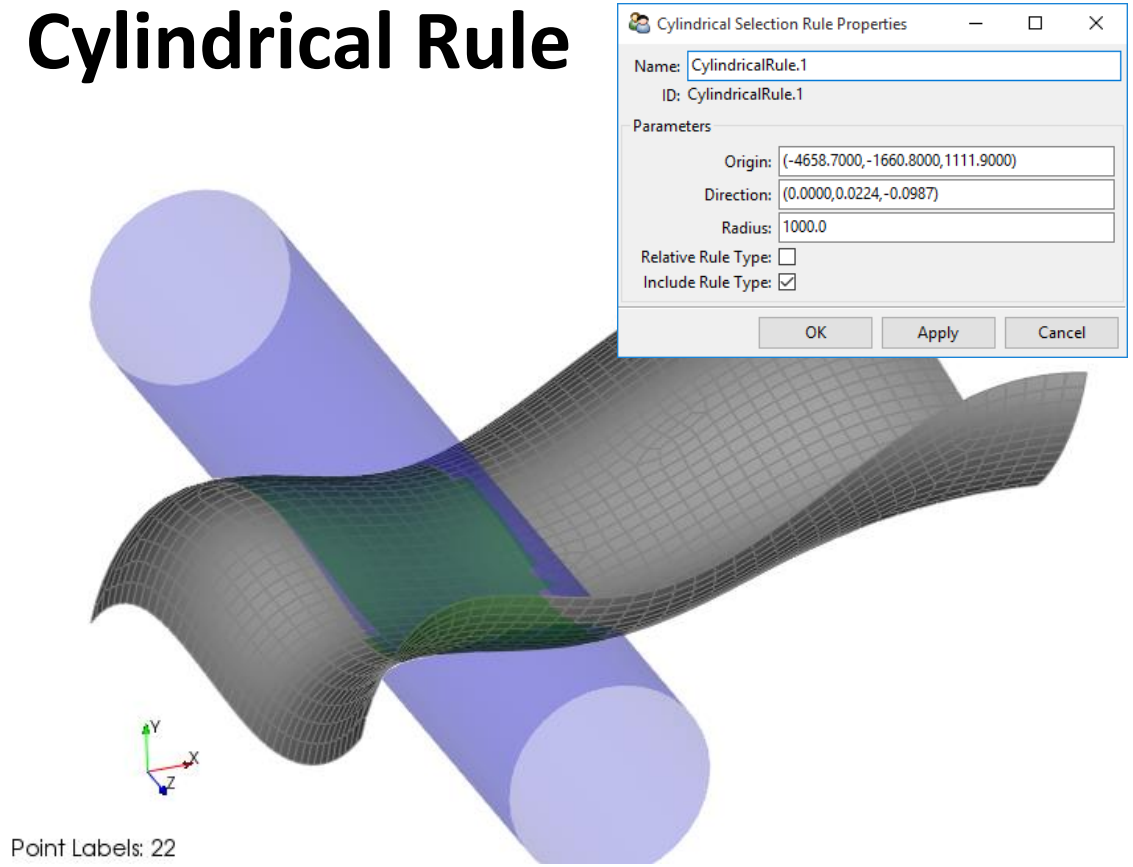


Parallel Rule to reselect elements within +/- 20% of the outer dimensions.

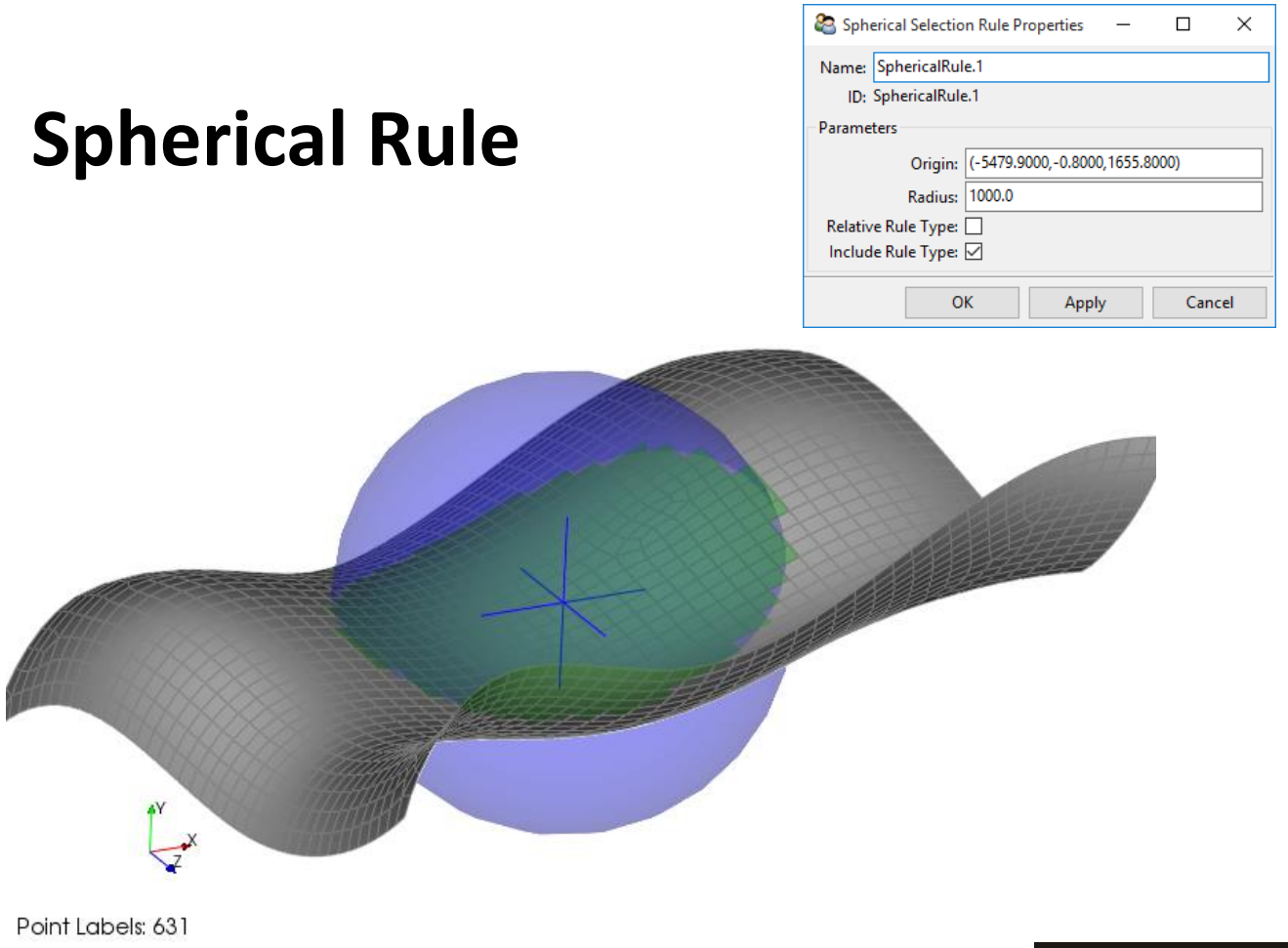
5.1 Rules

Different rule forms allow element selections based on simple geometrics:

Cylindrical Rule



Spherical Rule



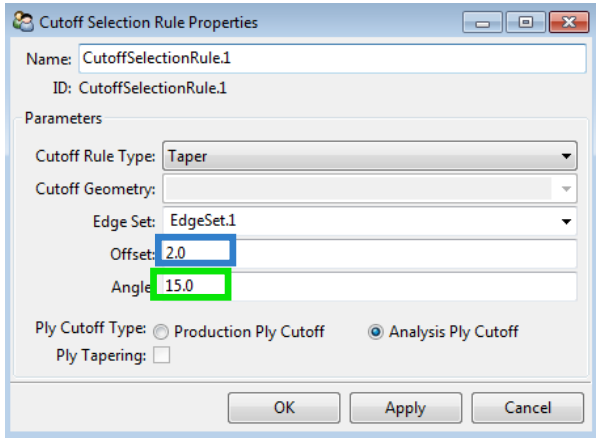
5.1 Rules

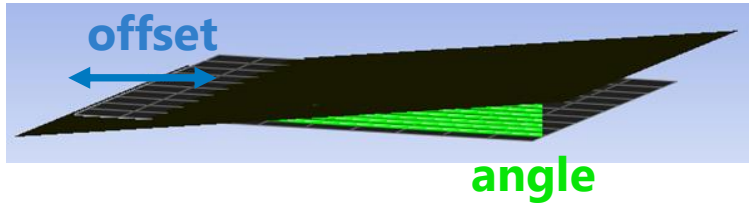
Cut-off Selection Rule

A Cut-off Selection Rule acts as a cutting operation on the composite layup

Taper Cut-off Selection Rule

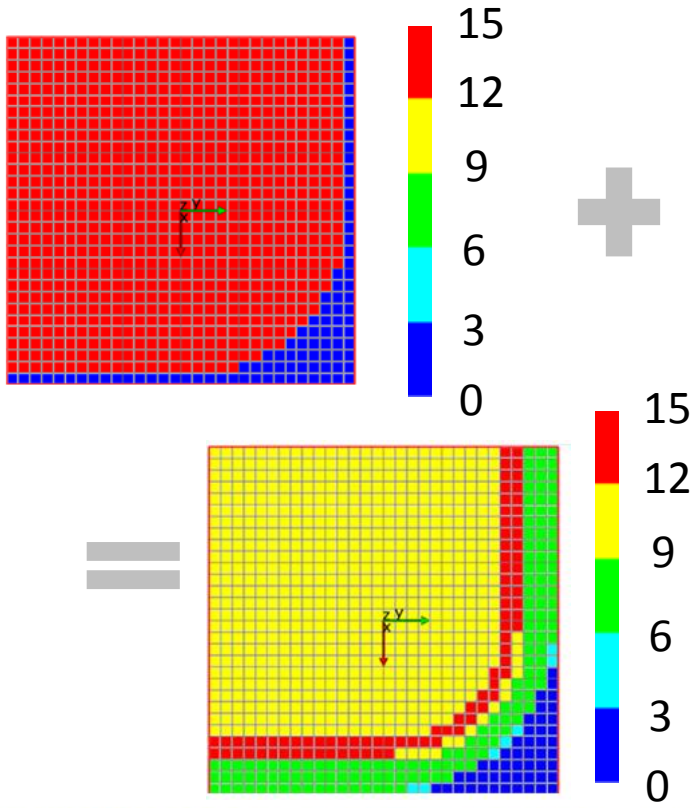
Use of an edge set in the model

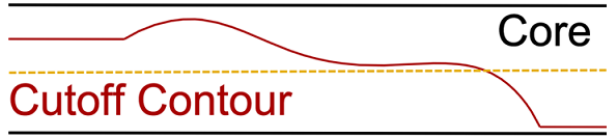


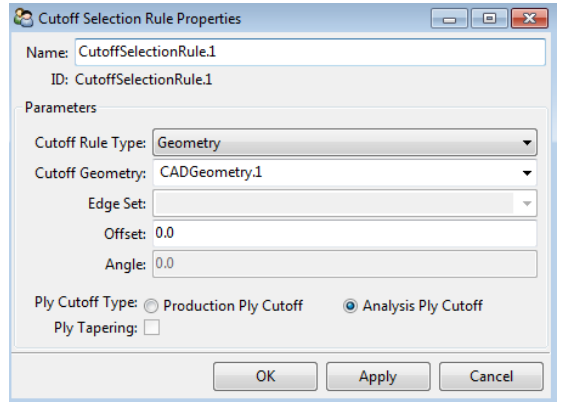


Geometry Cut-off Selection Rule

Use an imported geometry

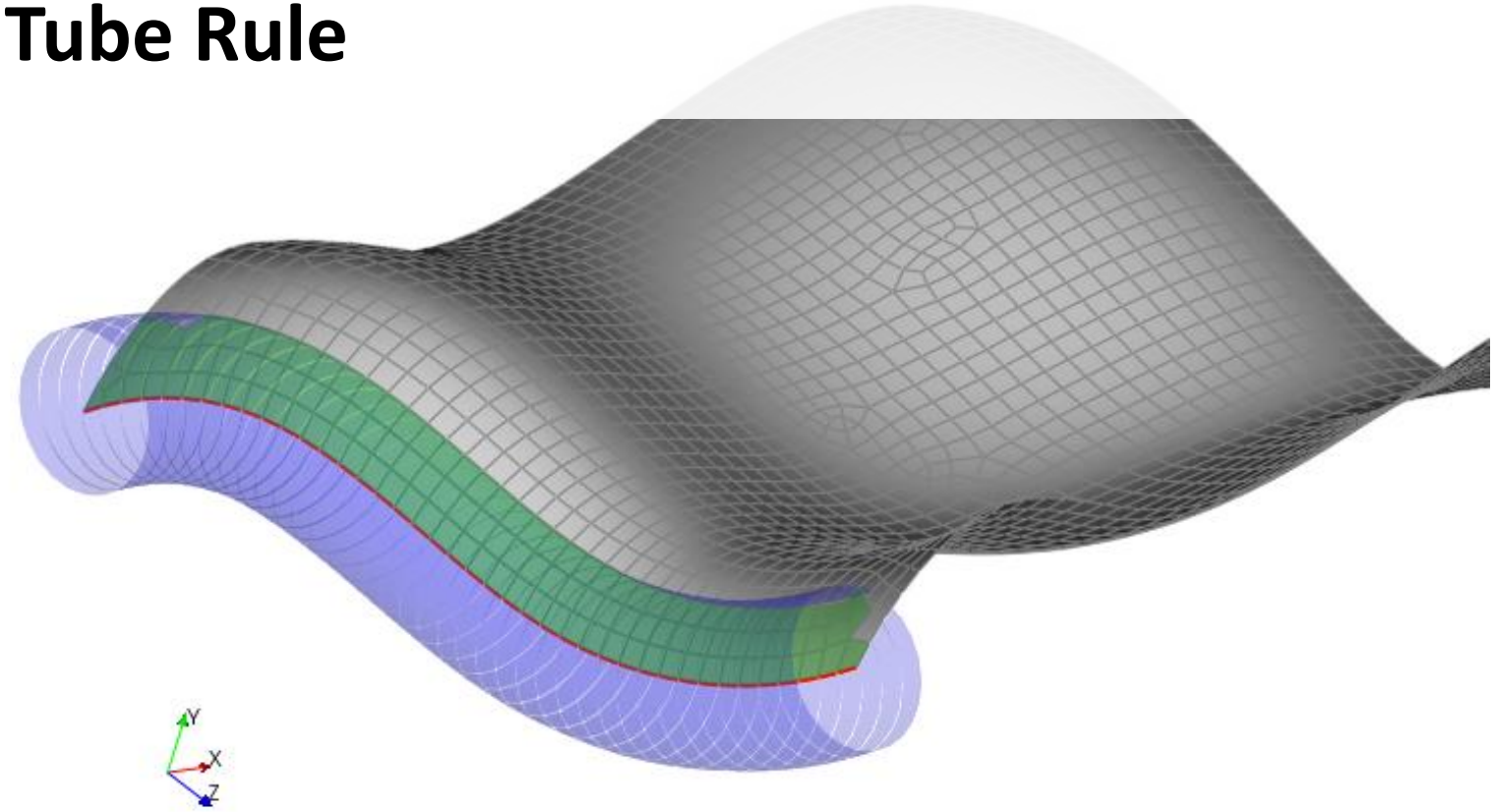




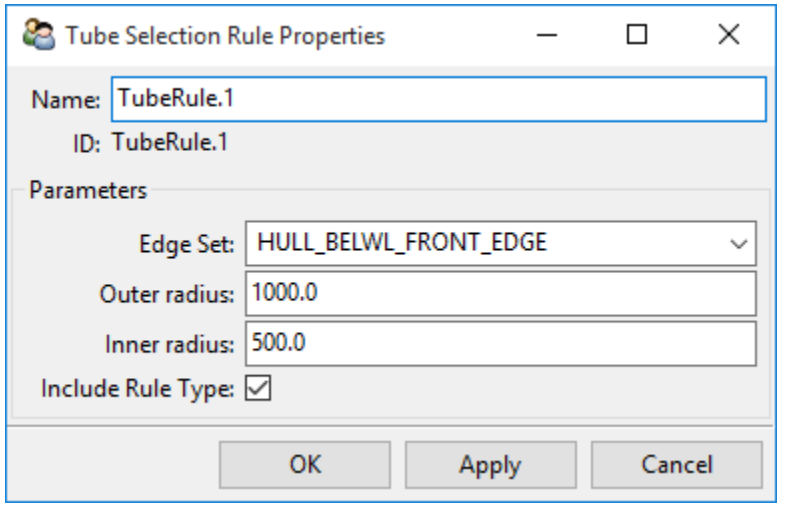


5.1 Rules

Tube Rule



Point Labels: 1743

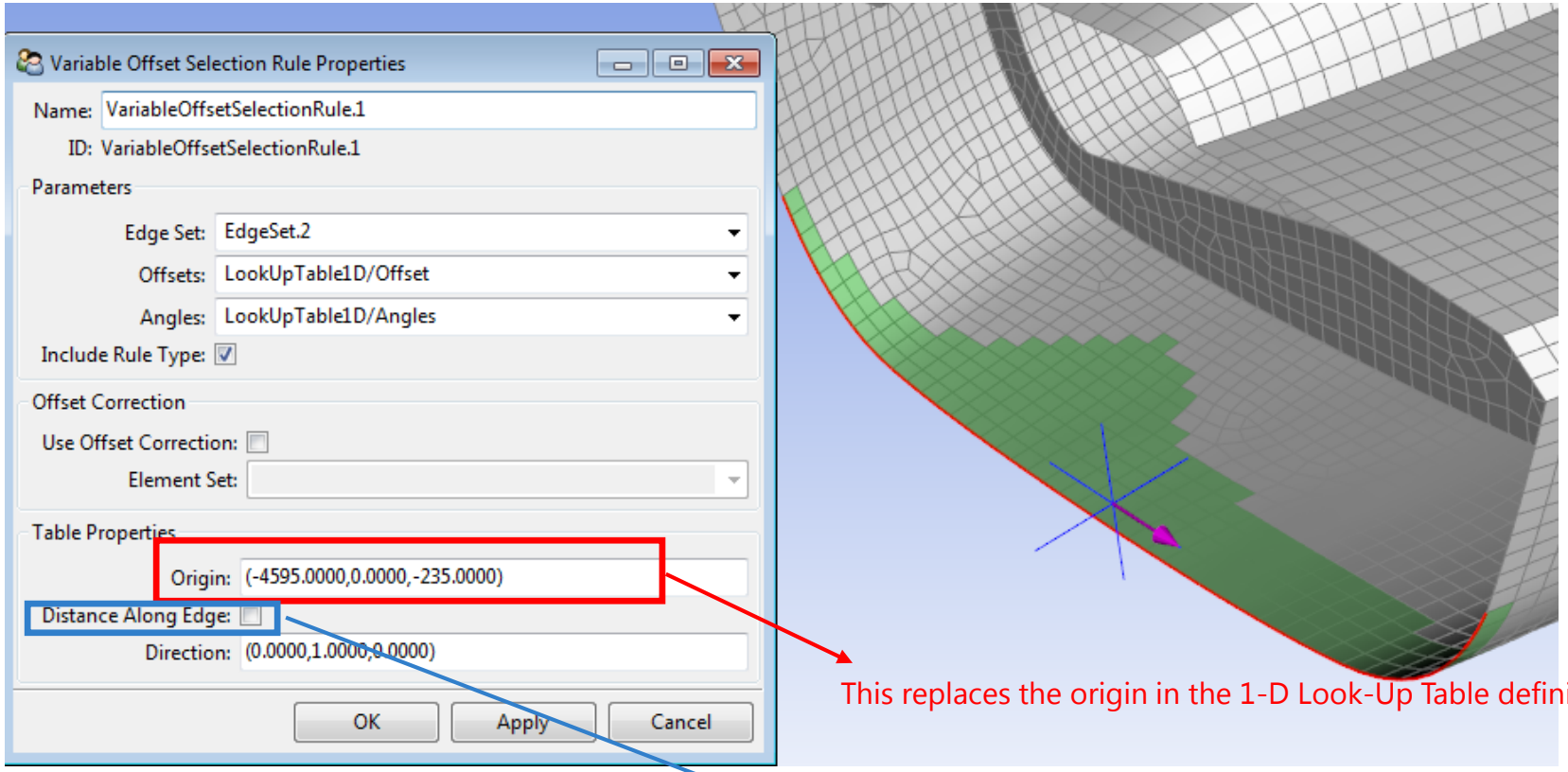


- Tube Rules are defined along edge sets. Edge sets are defined as named selections in ANSYS Workbench and transferred to ANSYS Composite PrepPost.

5.1 Rules

Variable Offset Selection Rule

The Variable Offset Selection Rule is defined on the basis of an Edge Set and a 1-D Look-Up Table containing a list of offsets at different locations. The offsets are linearly interpolated between locations. The rule behaves like an advanced Tube Selection Rule for which the outer radius can be varied.

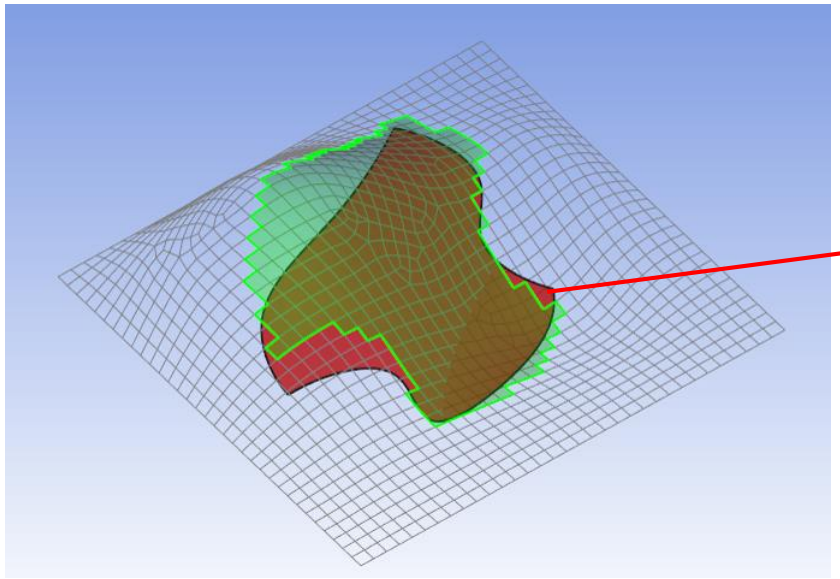


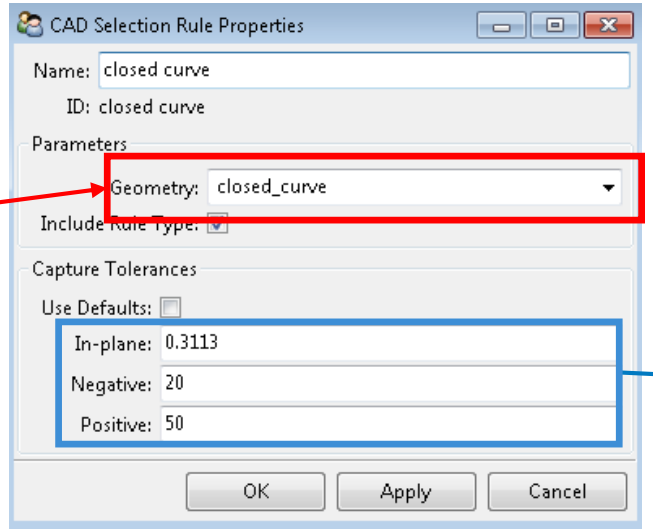
- **Edge Set**: The offsets are measured along this Edge Set
- **Offsets**: 1-D Look-Up Table with a list of offsets at different locations
- **Angles**: (optional) 1-D Look-Up Table with a list of tapering angles at different locations

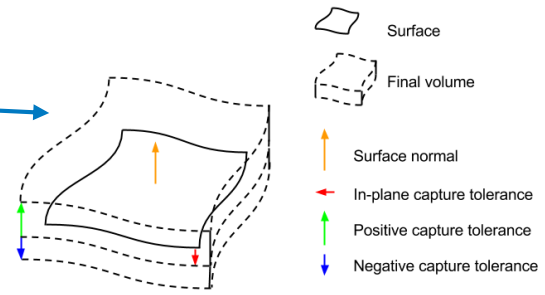
5.1 Rules

CAD Rule

Define the extent of a modeling ply or OSS based on an imported CAD surface or solid geometry





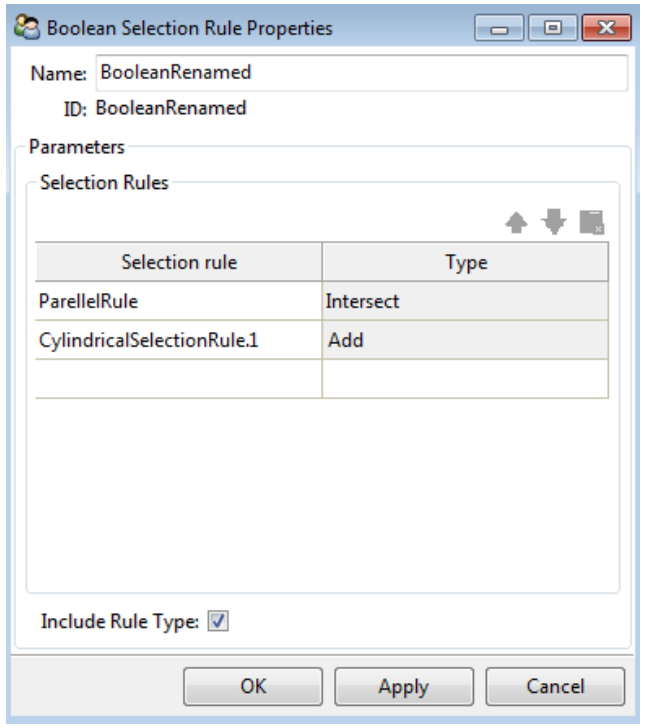


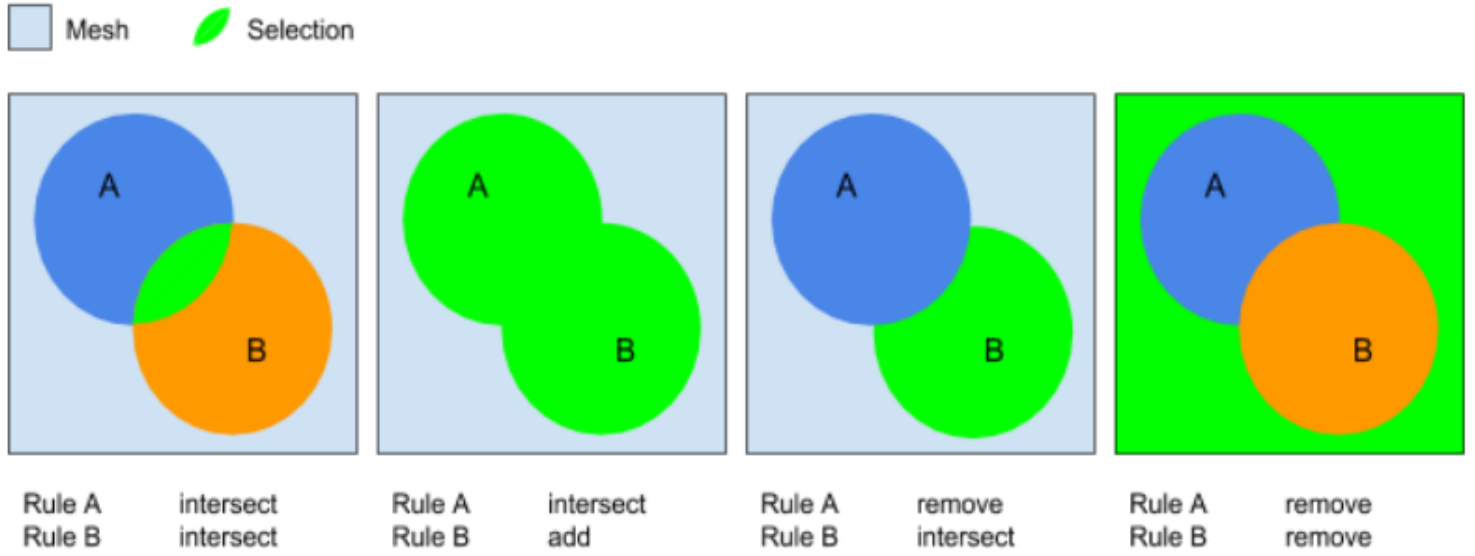
Capture tolerances are only used for non-solid geometries (surfaces)

5.1 Rules

Boolean Selection Rule

The Boolean Selection Rule enables you to combine rules based on boolean operations

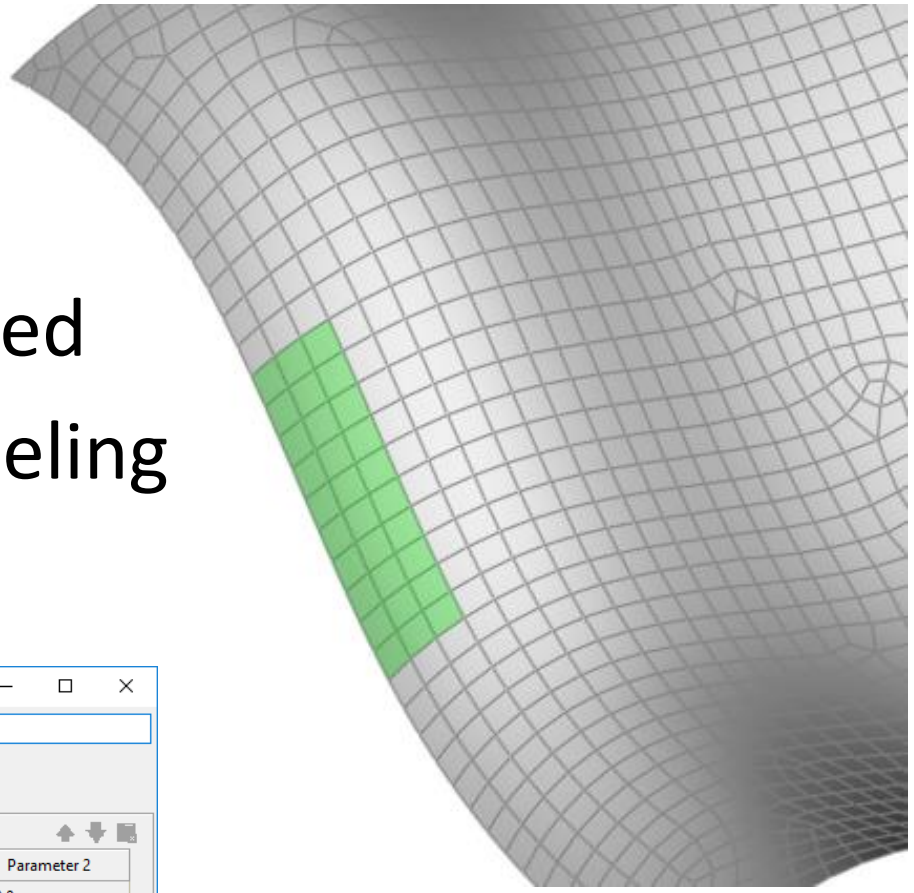


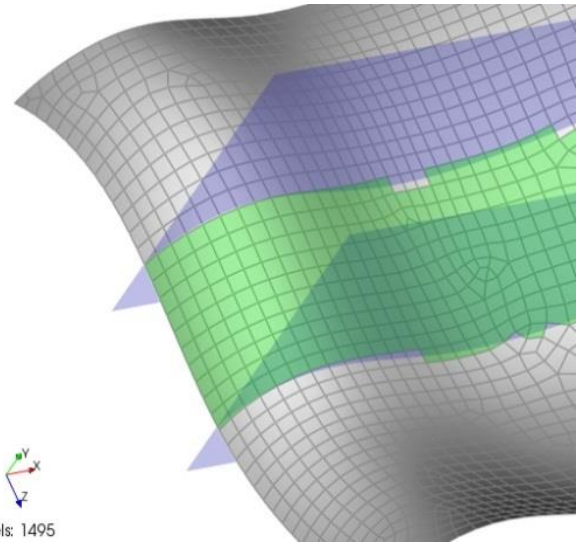


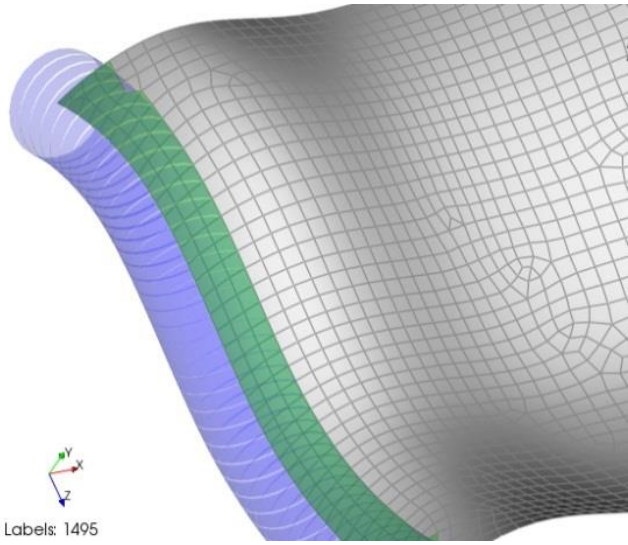
- Cutoff Selection and other Boolean Rules cannot be used within a Boolean Selection Rule
- The CSV interface does not support Boolean Selection Rules

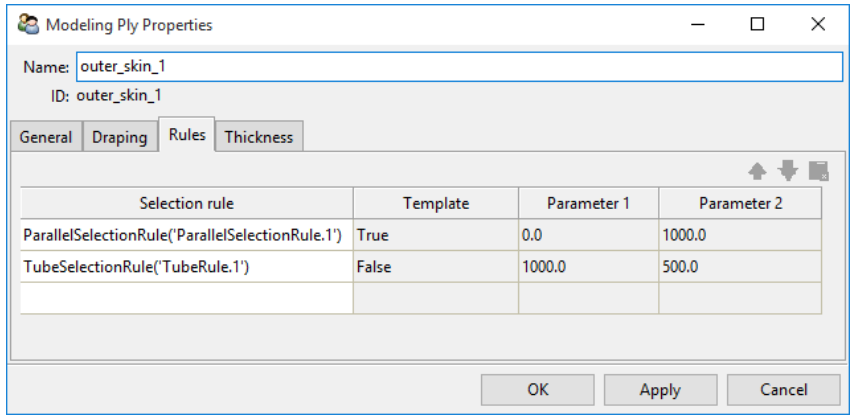
5.1 Rules

Multiple Rules
can also be combined
while defining modeling
plies



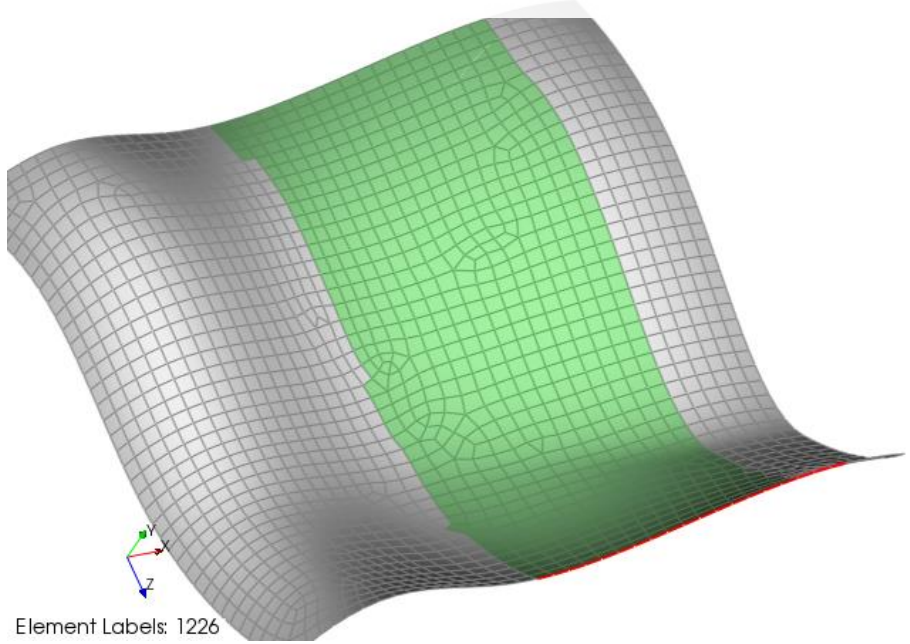


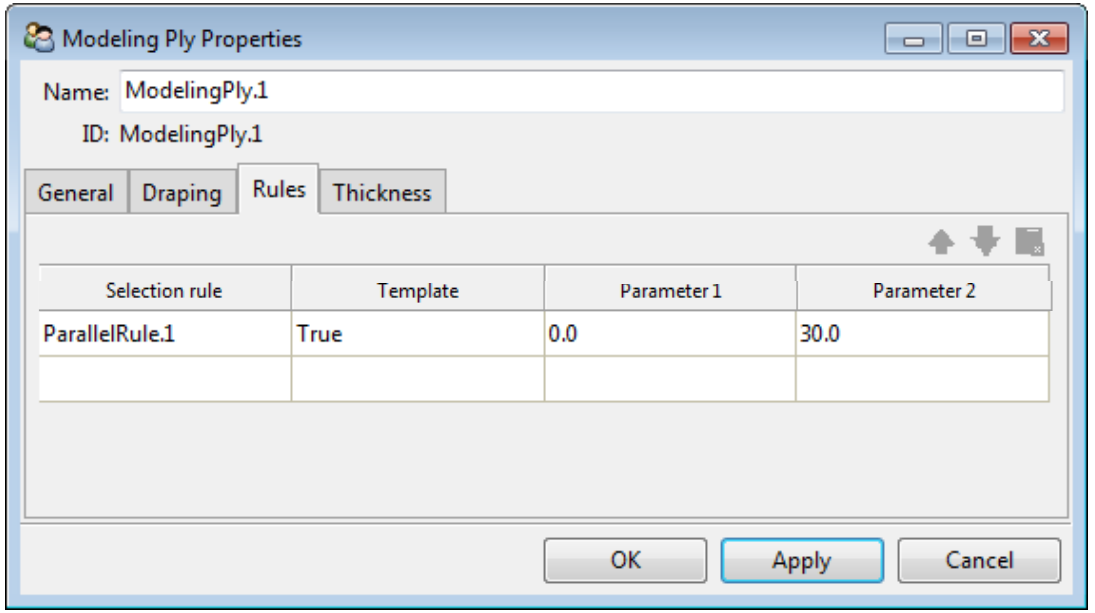




5.1 Rules

Template Rules

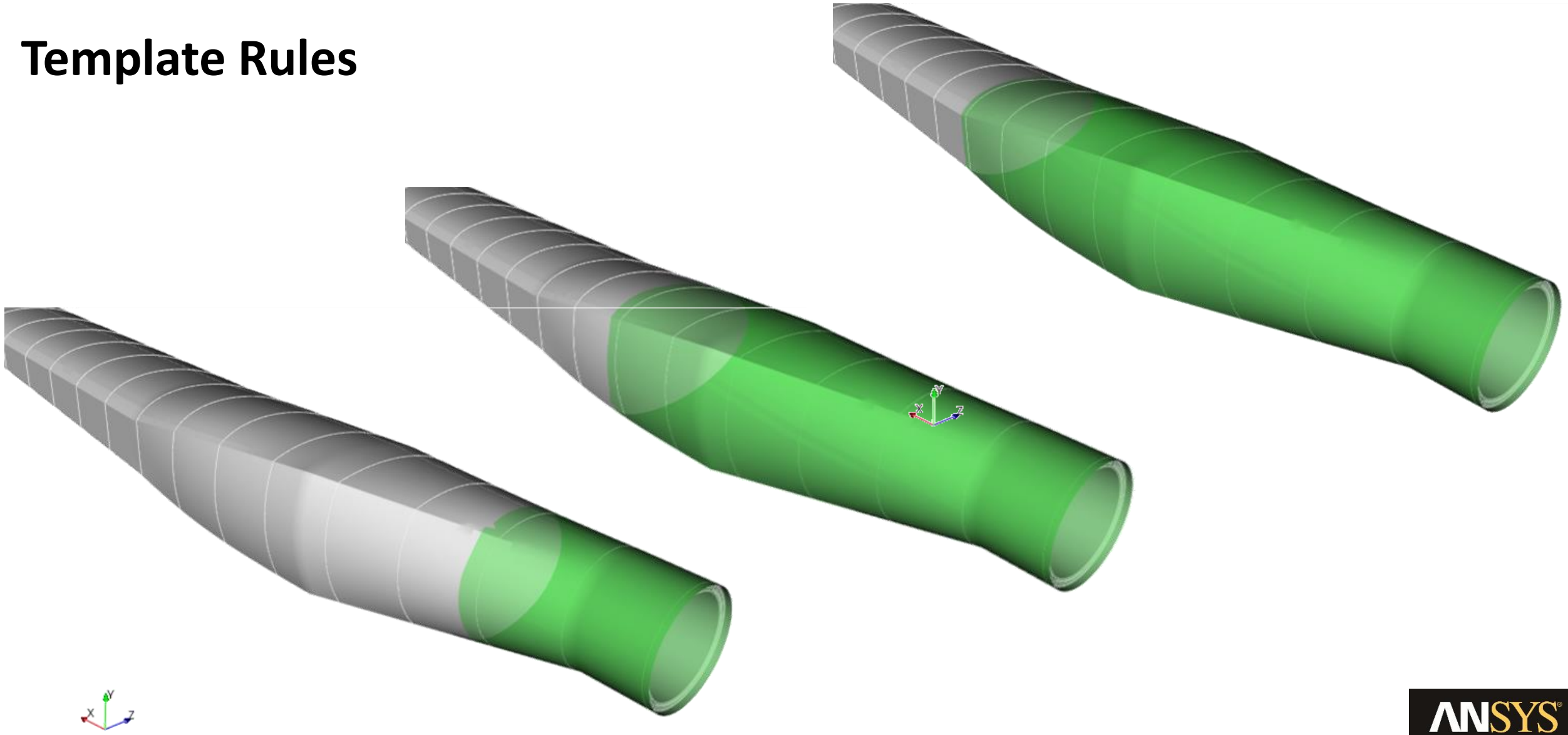




- A rule can be defined as template. The boundaries to define the layup area are then defined in the modeling ply properties.
- This allows using rules multiple times.

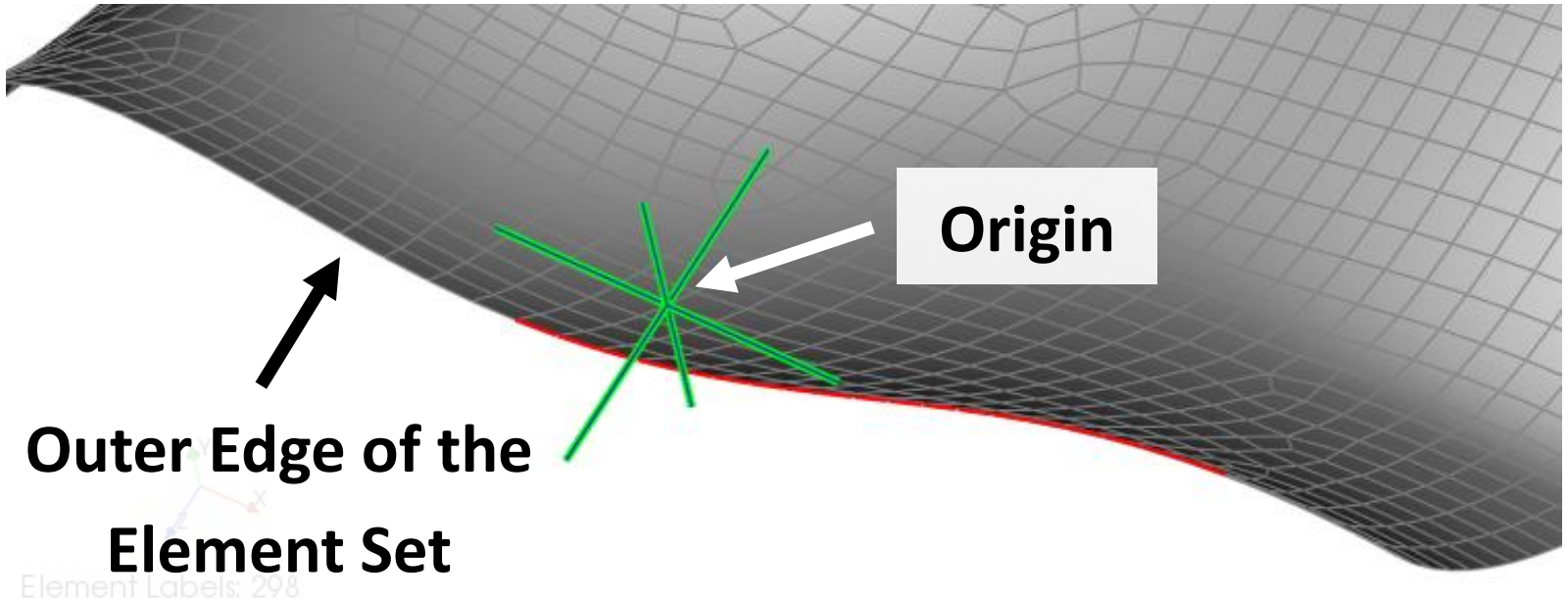
5.1 Rules

Template Rules



5.2 Edge Sets in ANSYS Composite PrepPost

- Edge Sets are usually defined as named selections in ANSYS Workbench. Sometimes its more convenient to create them in ANSYS Composite PrepPost.



- Edge Sets are created using the outer edge of an element set
- Origin and limit angle have to be defined

5.2 Edge Sets in ANSYS Composite PrepPost

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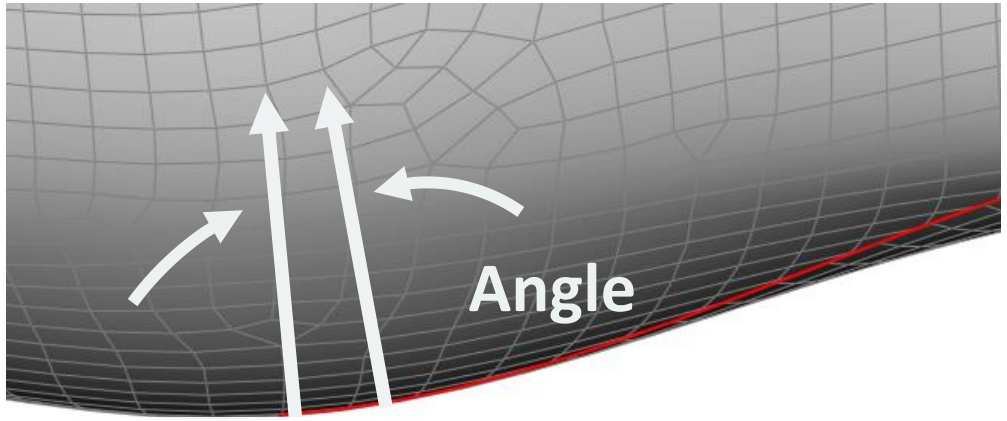

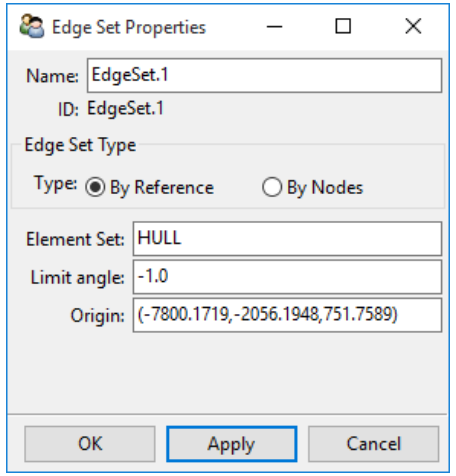

- The edge set starts near the origin by selecting parts of the element sets outer edge. The edge set is defined until the angle between two neighboring elements of the set reach the limit angle.
- A negative limit angle leads to all outer edges of the element set being used for the edge set generation.