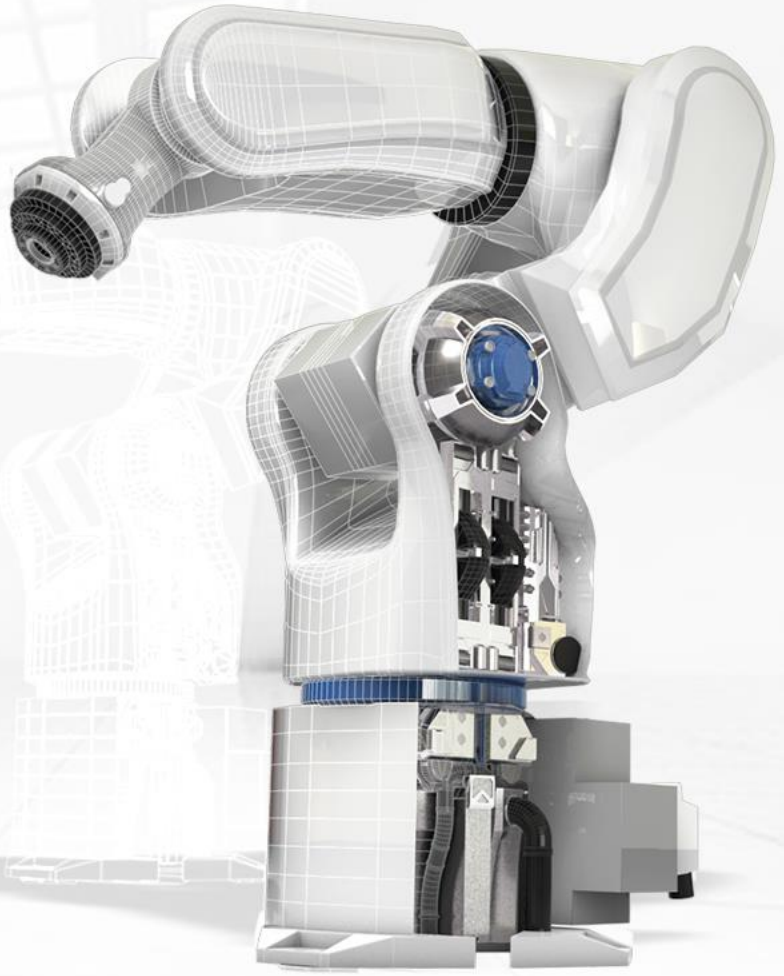
CAD Lesson5--- FreeForm Modeling

Flexible Design



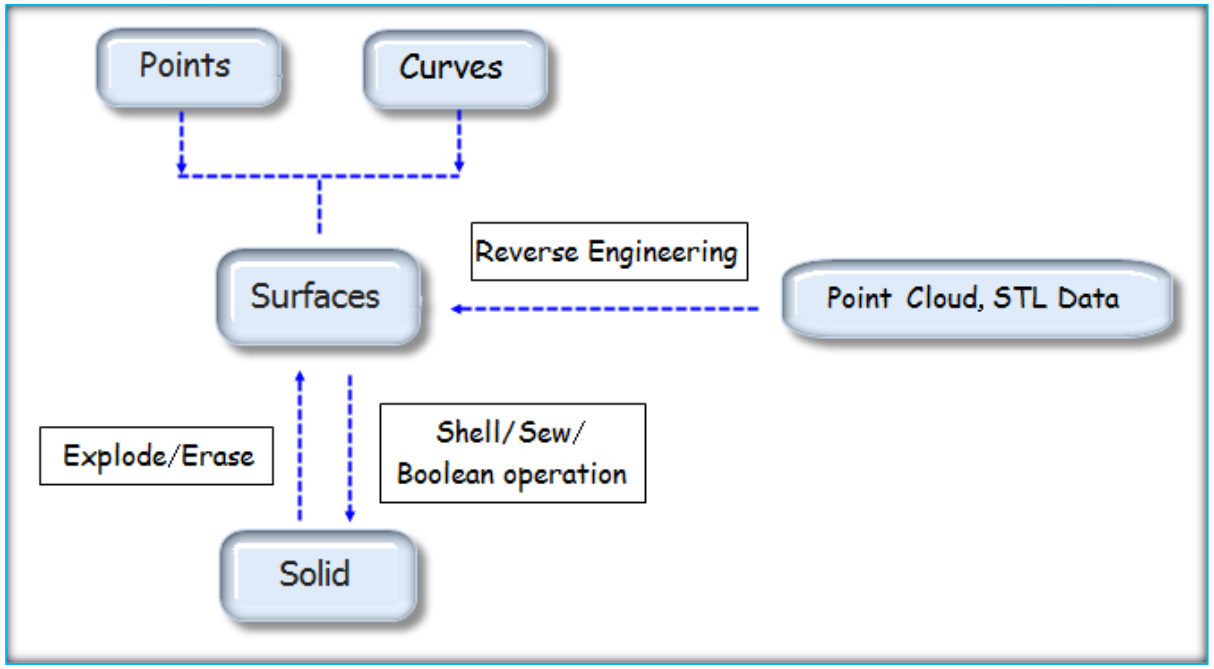
Context

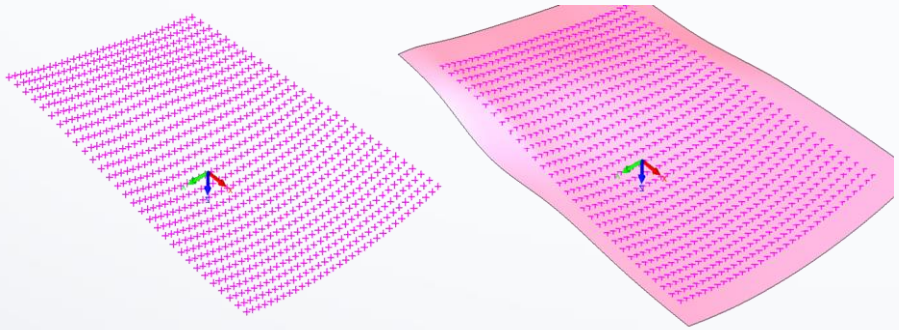
1. Surface Modeling Introduction
   – Surface Modeling Quality Analysis

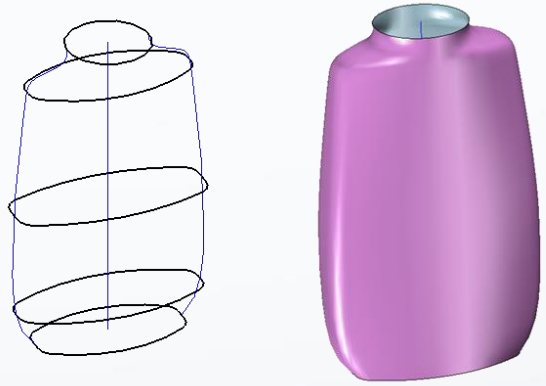
2. Common Key Features
   - Sweep
   - Loft
   - Blend face
   - Ruled, Circular/Conic bi rail
   - U-V Curves Mesh
   - FEM patch & N-sided patch
   - Trimmed plane & Loop

3. Cases

Surface Modeling Introduction



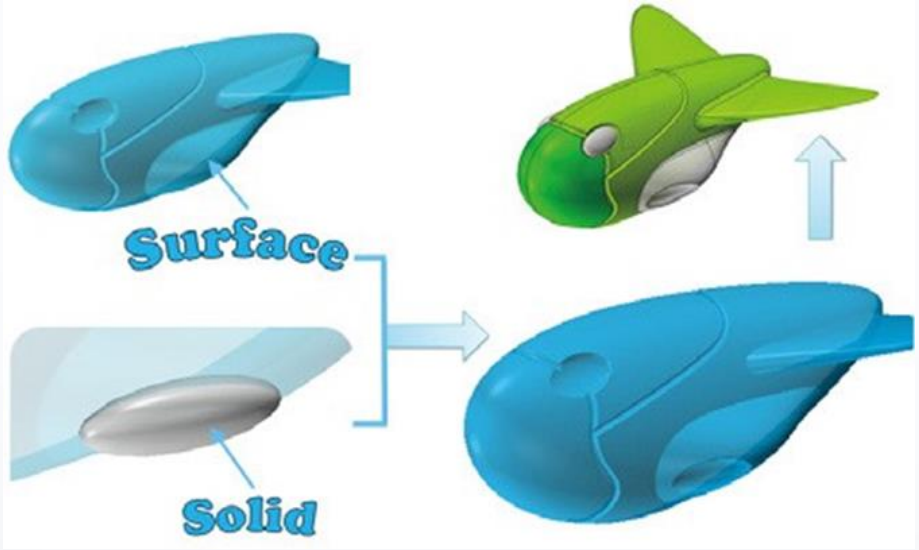




Advantages of ZW3D Surface Modeling

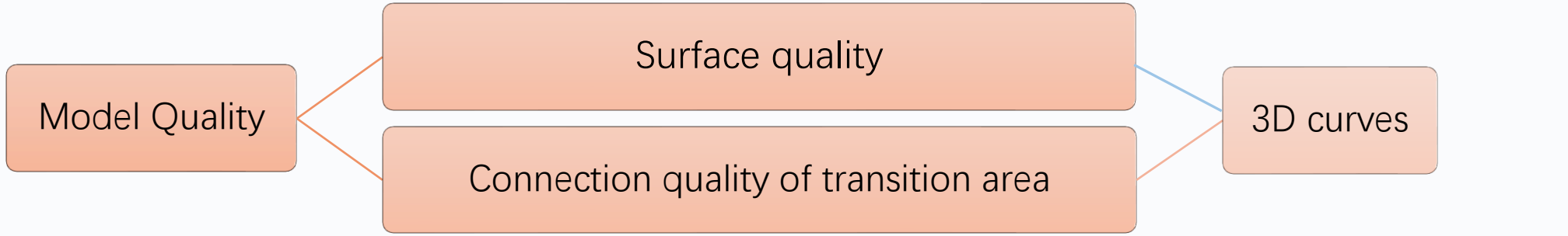
- Unique Solid-surface Hybrid modeling
  - It’s possible to make Boolean operation for surface parts directly with solid geometry.
  - It’s easy transfer between the surface geometry and the solid geometry.

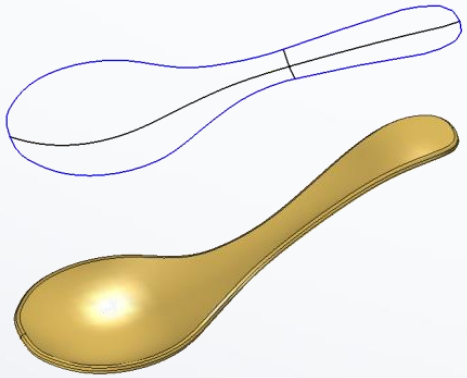
- Good capability for surface modeling and High quality surface

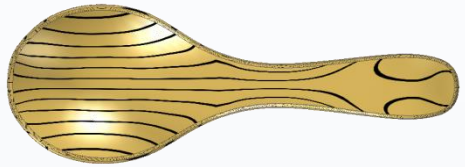


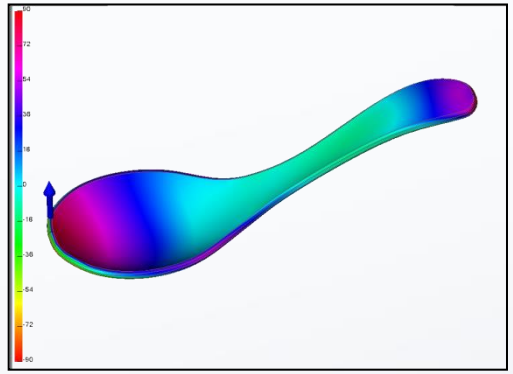
Surface Modeling Quality Analysis

- Inquire -> Analyze fa



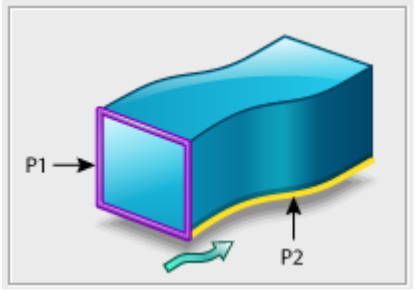




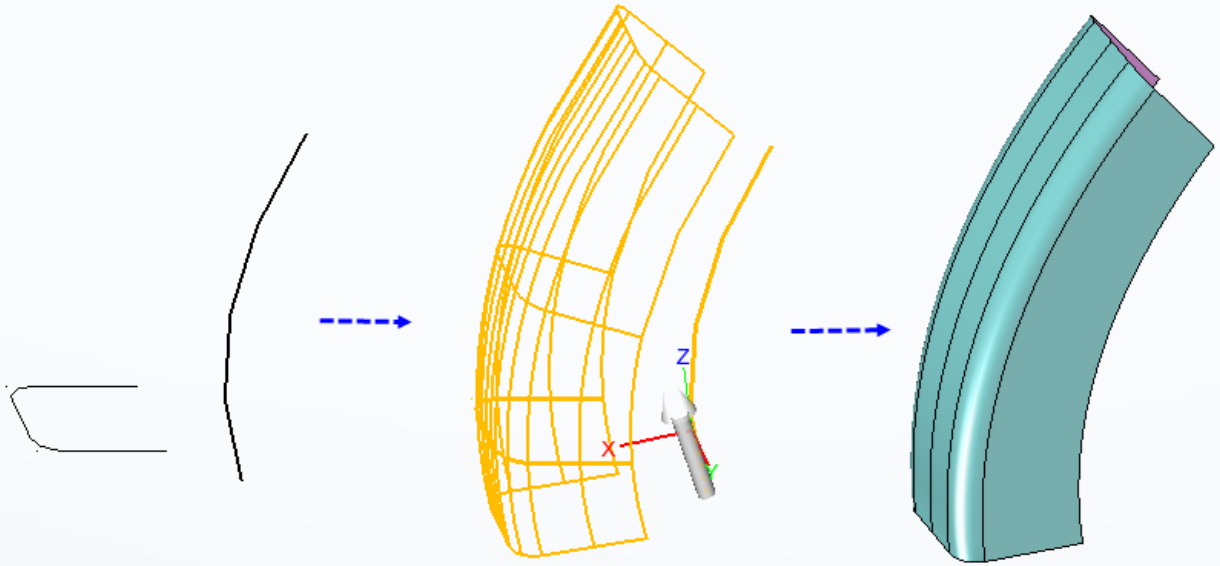


Common Key Feature1--Sweep

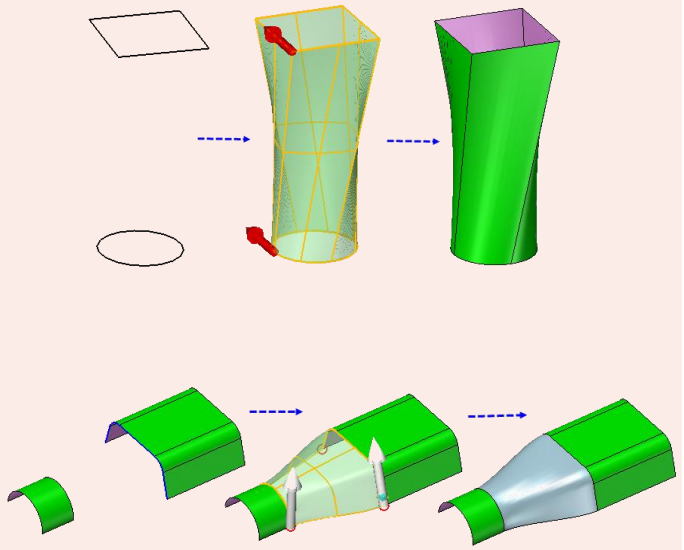
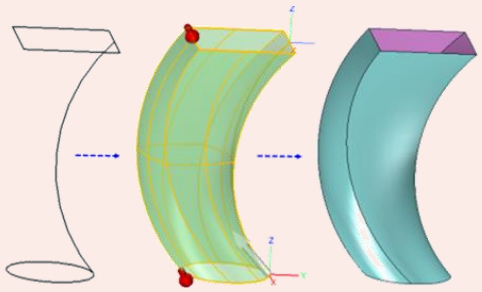
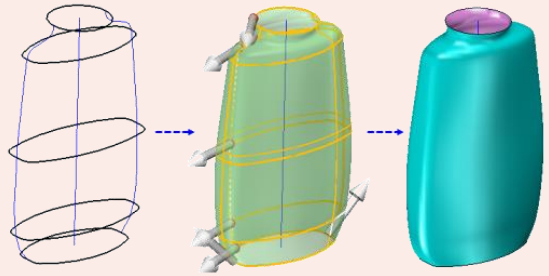
- One Profile, One Path
- Option: Define the position and size of each section



<u>The path must be consisted by the tangential curves and lines</u>

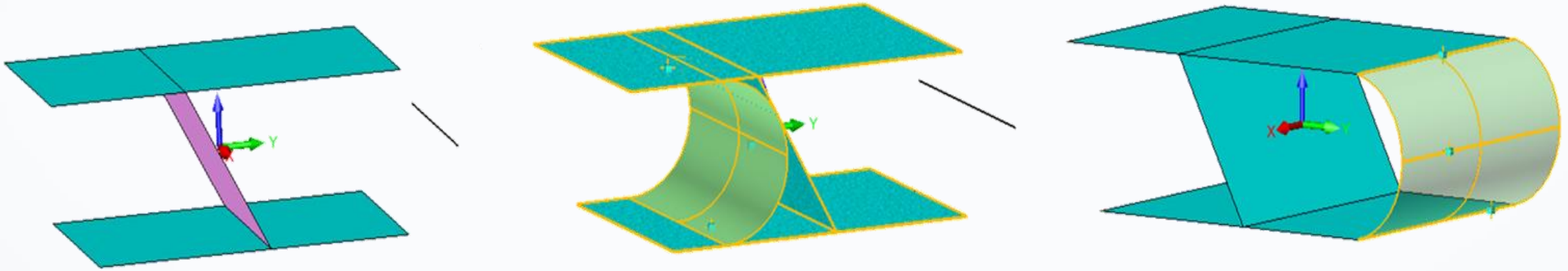


Common Key Feature2--Loft

Feature	Loft	Drive curve loft	Bi rail loft
Profile	> 2	> 2	> 1
Guide curve	x	1	2
Boundary constraint	Y	N	N
Case			

Common Key Feature3--Blend face

- Create an intelligent blend face by the curves, edges, or faces



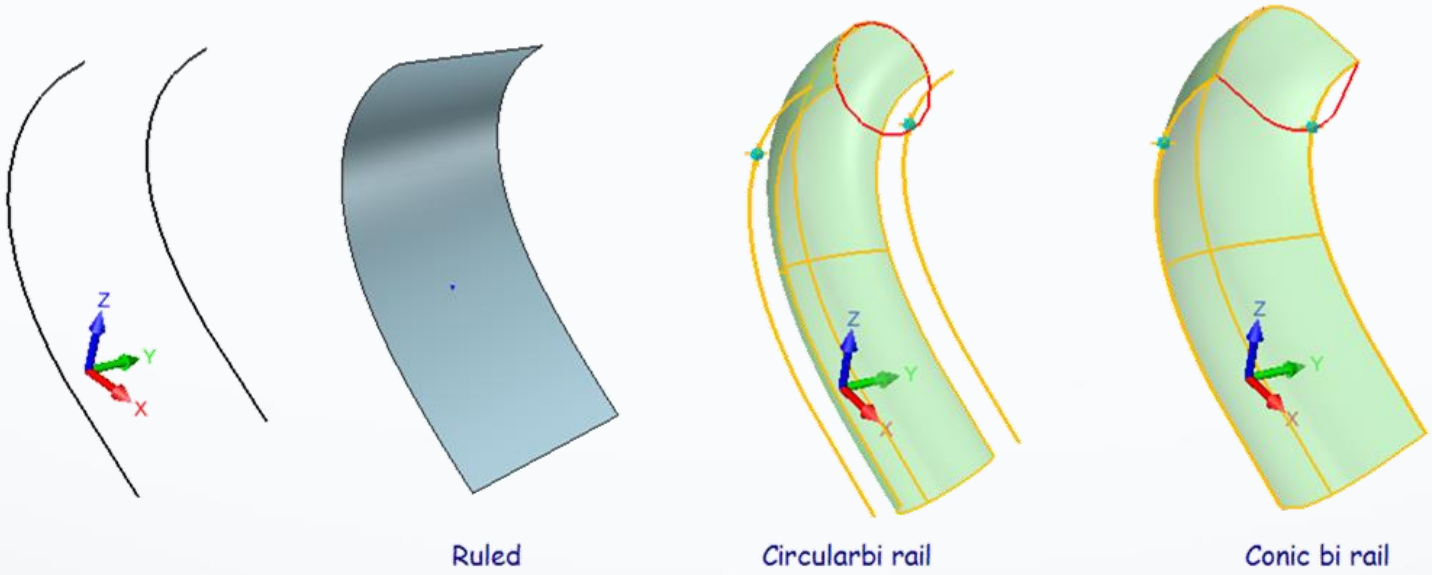
Common Key Feature4-- Ruled, Circular/Conic bi rail

- Ruled:

Create a ruled face with linear cross-sections between two paths

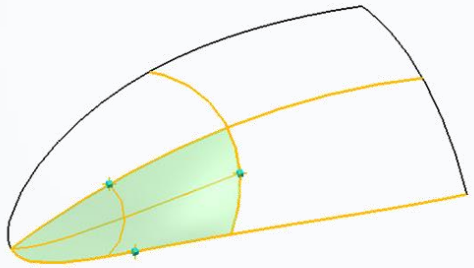
- Circular/Conic bi rail

Create a face of circular/conic cross-section between two path curves

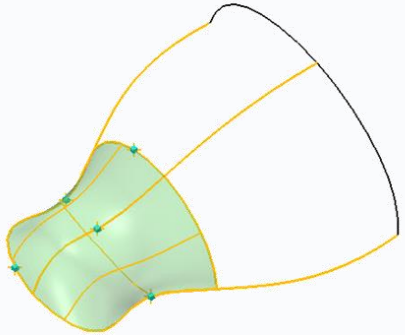


Common Key Feature5-- U-V Curves Mesh

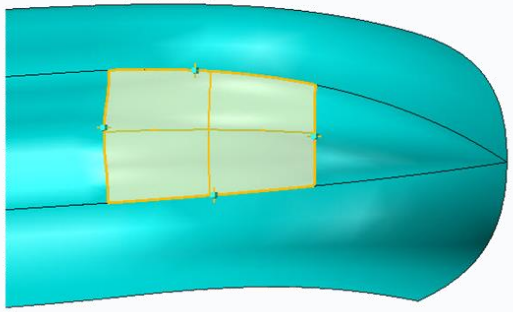
- Two group curves： U curves, V curves
- Option: Boundary constraint



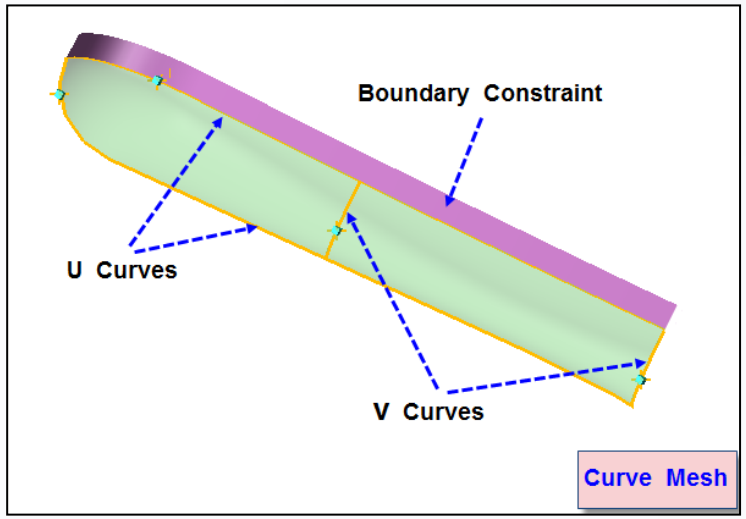
3-sides face



4-sides face



tangential U-V mesh face



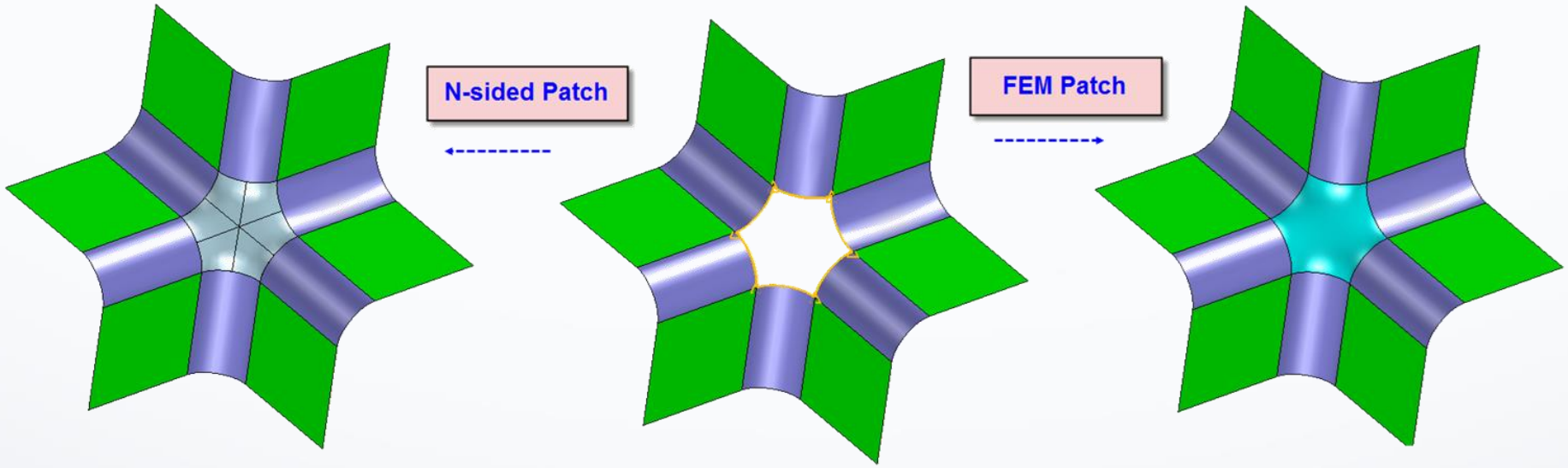
Common Key Feature6-- FEM patch & N-sided patch

- FEM method:

Create a ***single*** surface through a set of points on boundary curves

- N-sided method:

Create a patch surface consisted of *4-sided NURBS faces*



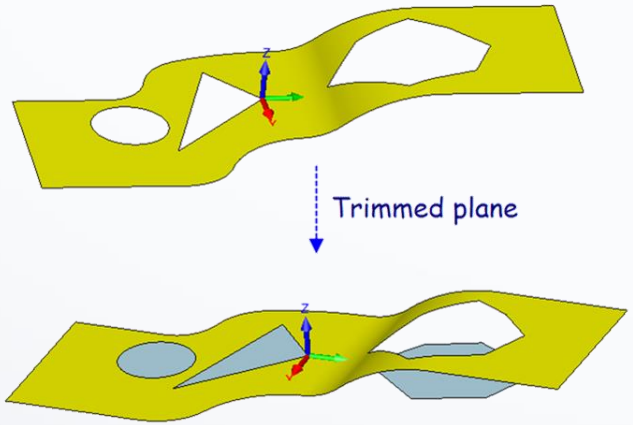
Common Key Feature7-- Trimmed plane & Loop

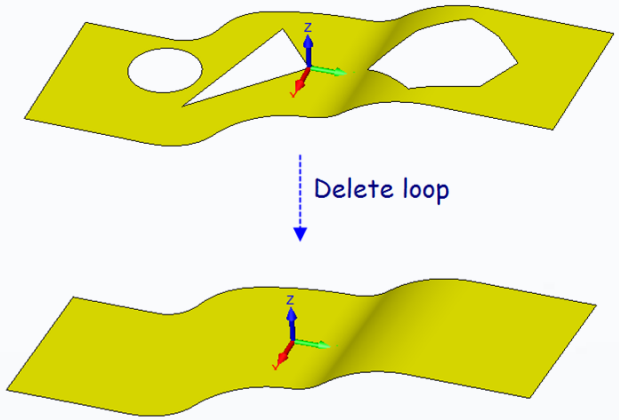
- Trimmed plane:

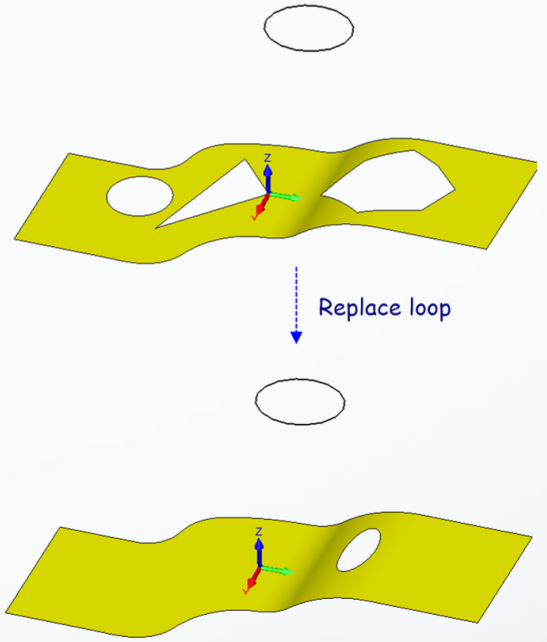
create a planar face trimmed to a set of bounding curves.

- Loop operations:

Delete/Replace/Invert loop







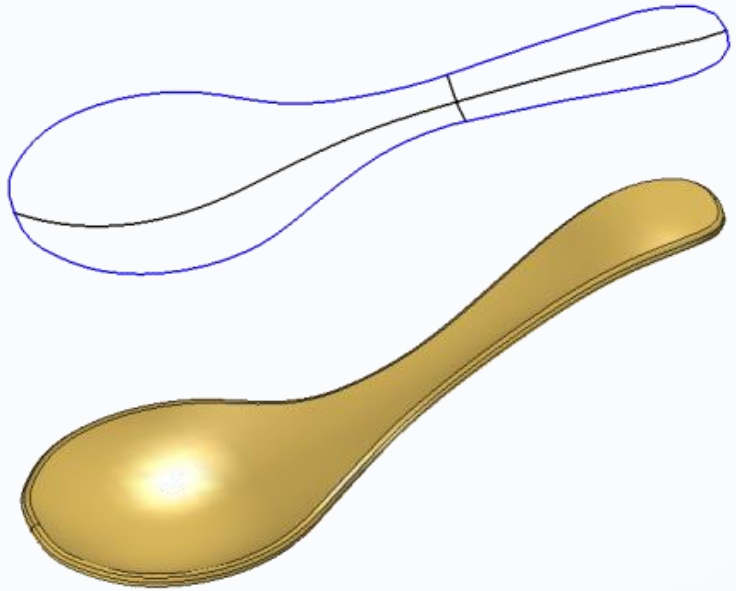
Case 1- Spoon

- Simple surface modeling

- Modeling knowledge points:
  1) Draw smooth Sketch
  2) Create 3D curve
  3) Create surface by ***Curve Mesh***
  4) ***Morph***

- Time

  30 mints



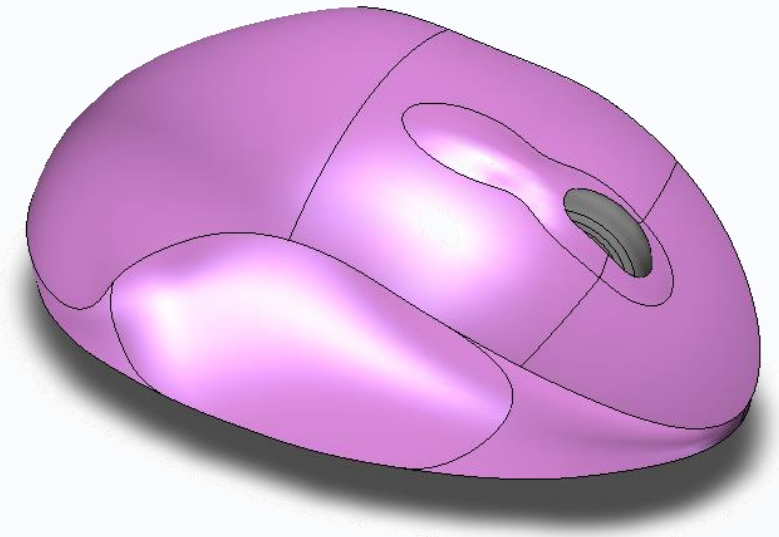
Case 2- Mouse

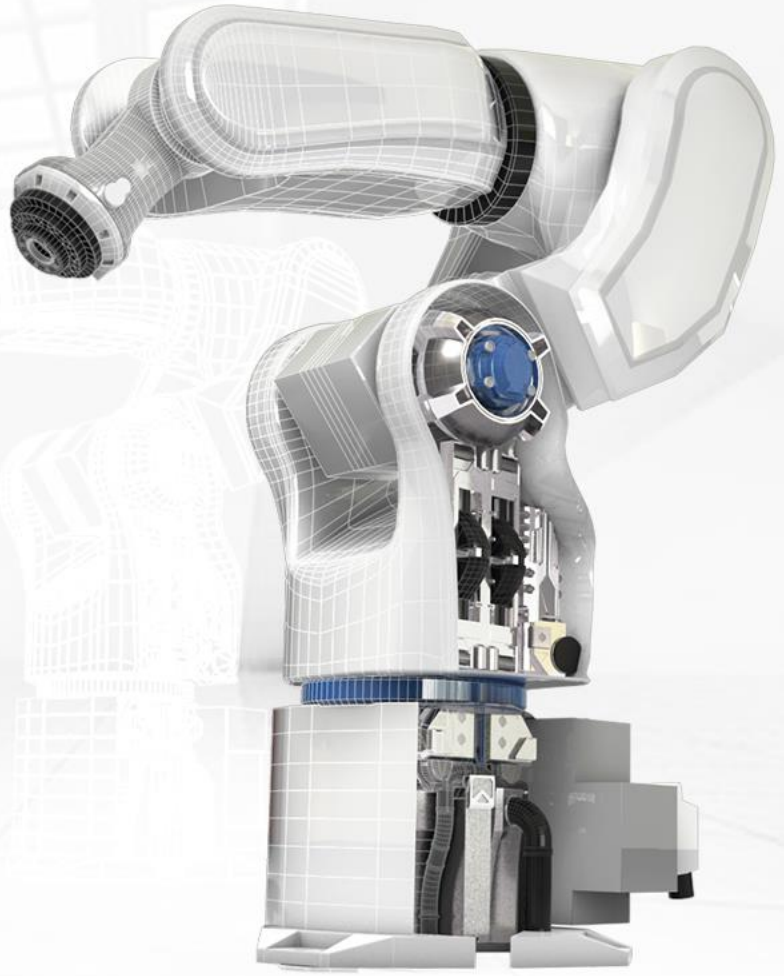
- Typical surface modeling

- Modeling knowledge points:
  1) Convert 2D drawing to 3D model
  2) Create surface by Curve Mesh
  3) Create surface by Loft
  4) Create Blend Curves
  5) Surface operation: Trim, Sew, Explode

- Time

  30 mints





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