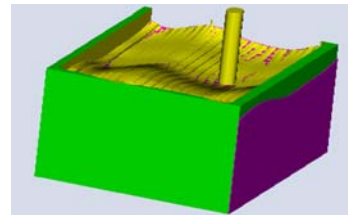
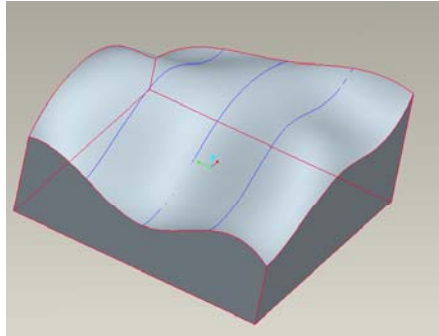
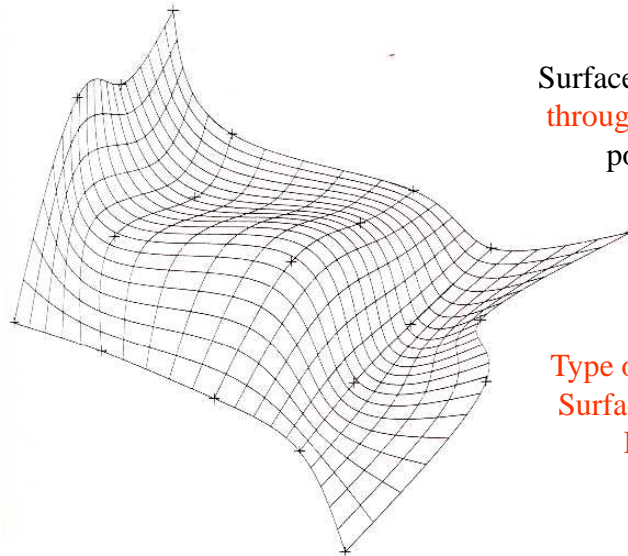


Generation of Free-form Surface in Pro/ENGINEER



B-Spline Surface

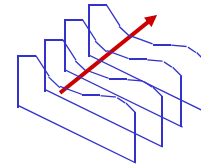


Surface patch go
through control
points

Type of B-Spline
Surface Used in
Pro/E

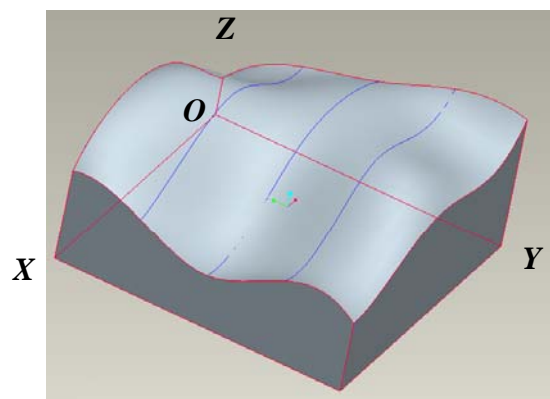
Variable Section Sweep

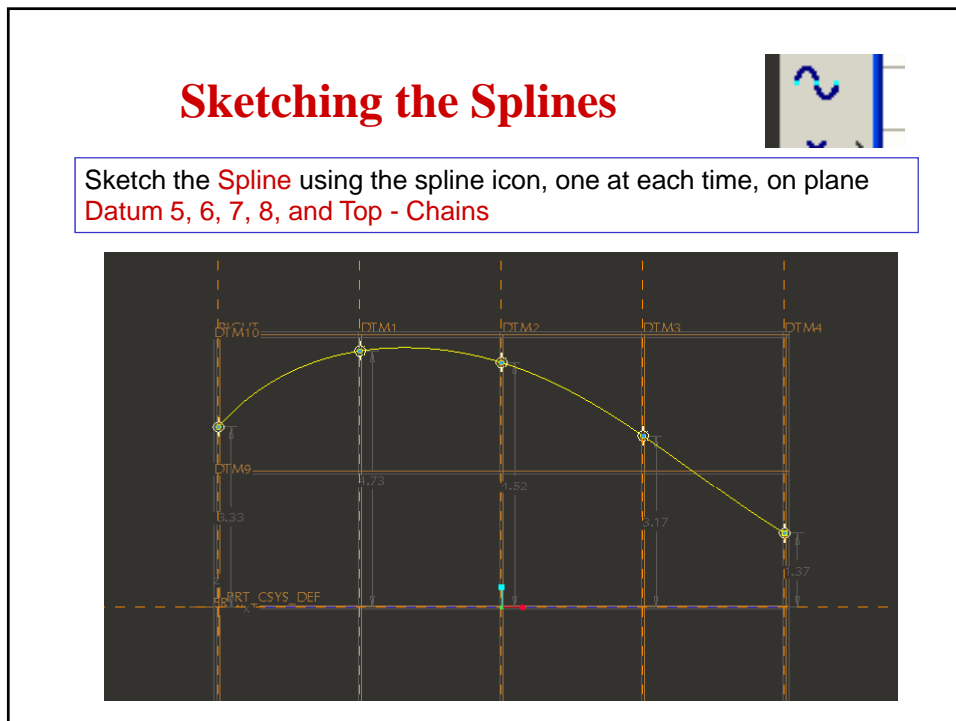
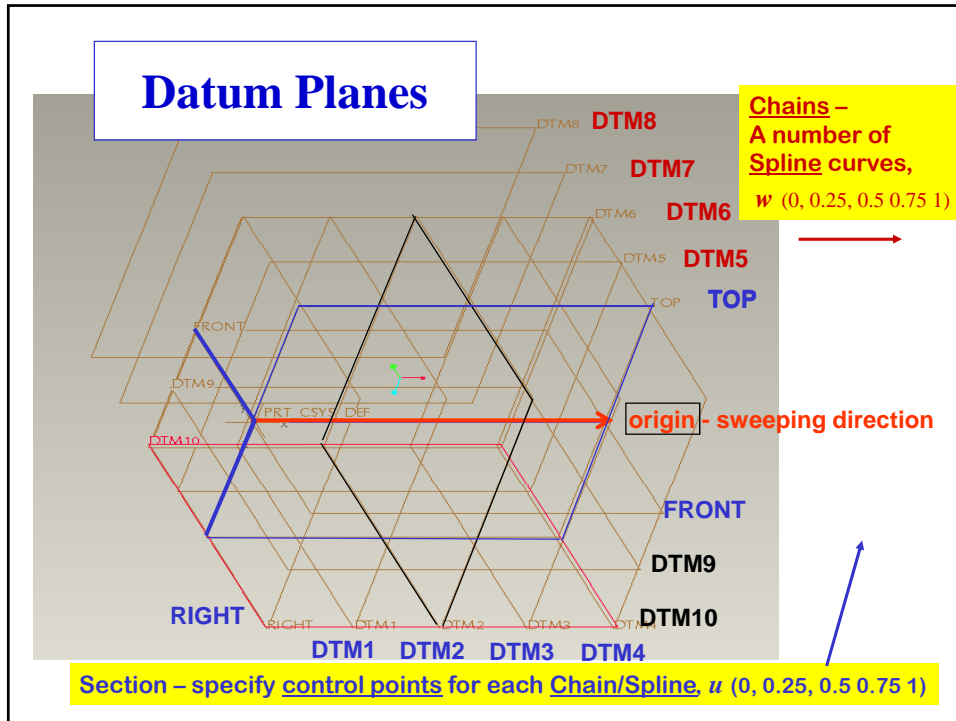
- **Trajectory**
 - **Origin** - the direction of the sweeping and the orientation of the section view
 - **Chains** – curves/constraints used to define the shape of the surface (in the direction of sweep).
There are no limitation on the number of chains (w).
- **Section** - the cross section view perpendicular to the direction of the sweep (u)
 - Only splines are used.



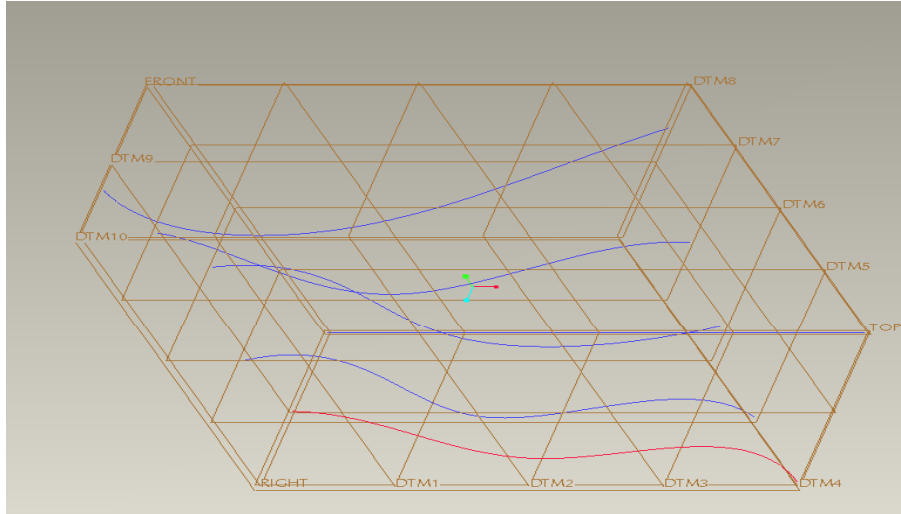
An Example of Spline Model

A solid that lies on the XOY plane, and the curved surface has surface normal in positive Z direction

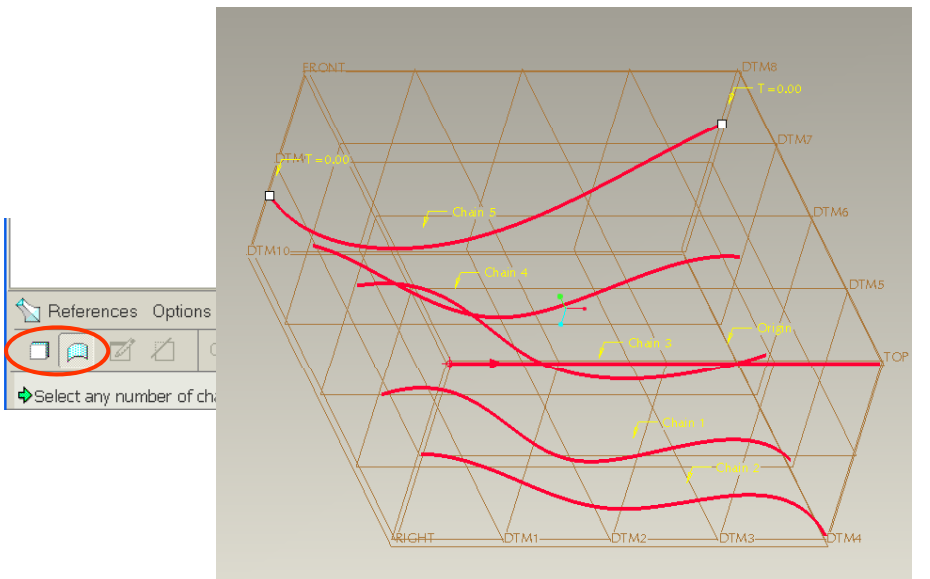




Trajectory - Origin and Chains (All Spline Curves)

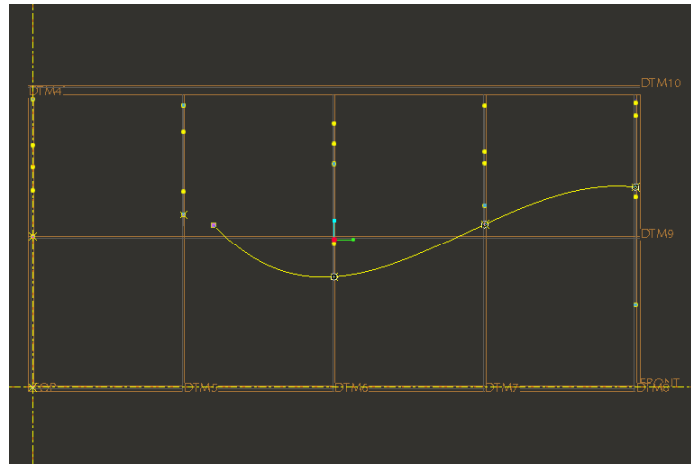


Identifying Origin and Chains



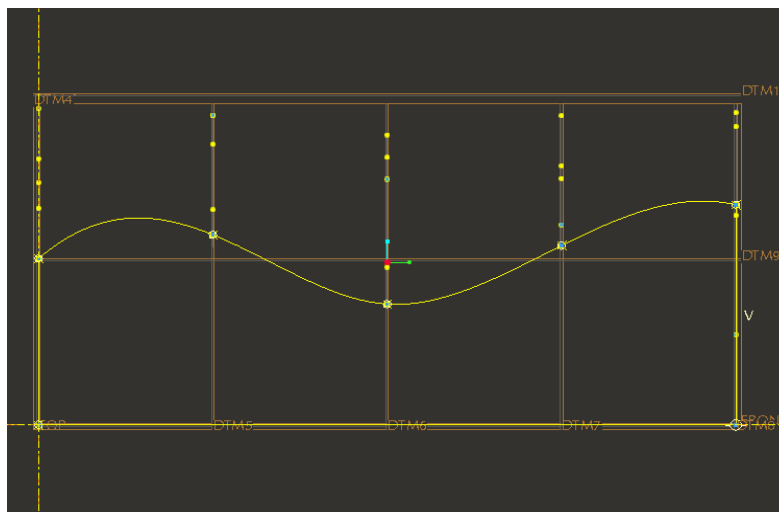
Sketch Sections for a Surface

Perpendicular to the direction of the **Origin**, another spline (**Section**, controlled by parameter u) is defined using the **Crosses** that represent the intersections of the **Chains**.



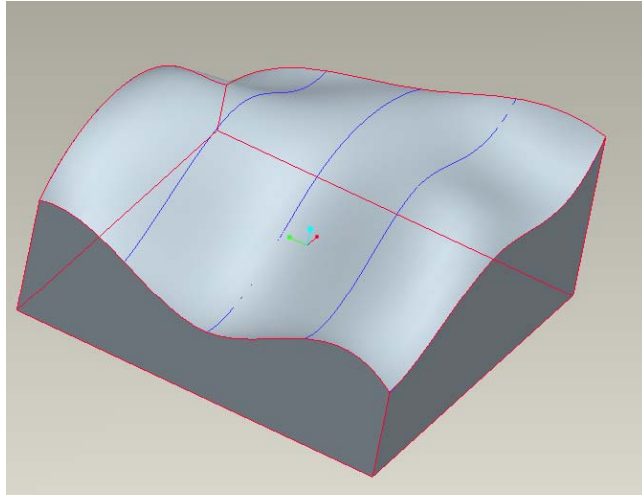
Sketch Sections for a Solid with Curved Surface Boundary

A closed cross section for a solid

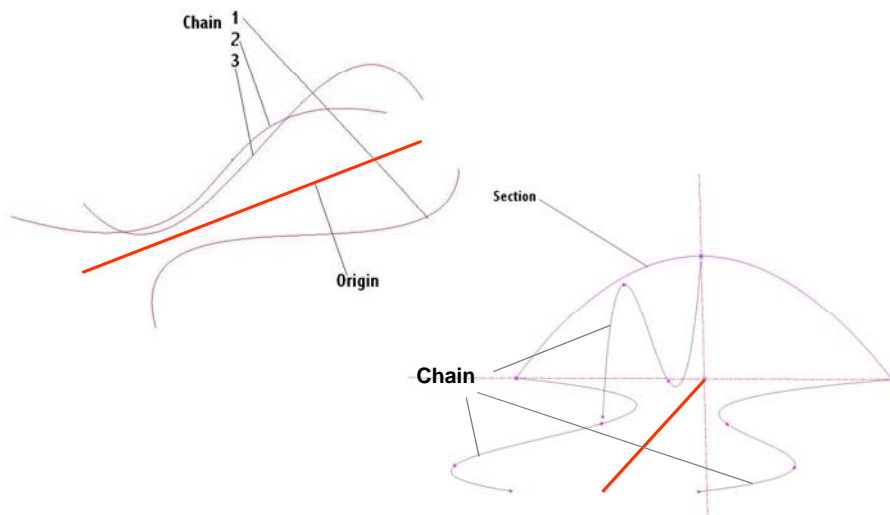


Finished Solid with Free-form Surface

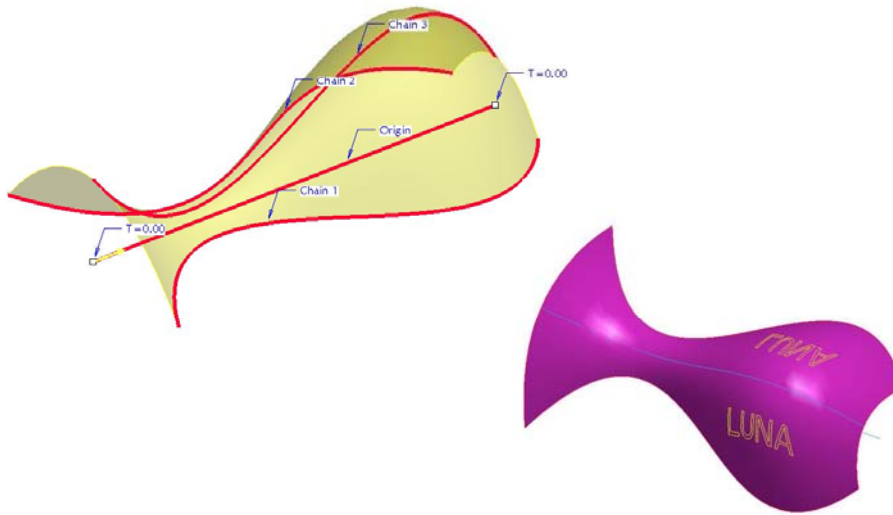
Variable Section Sweep – an advanced feature of the Pro/E Wildfire.



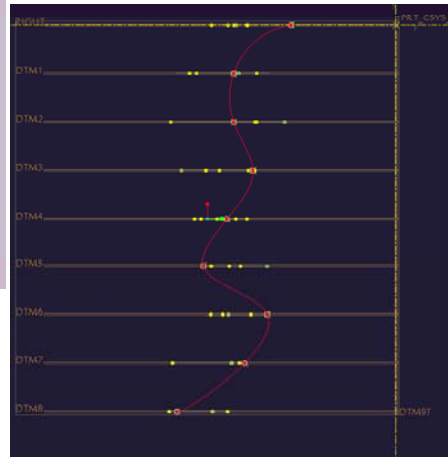
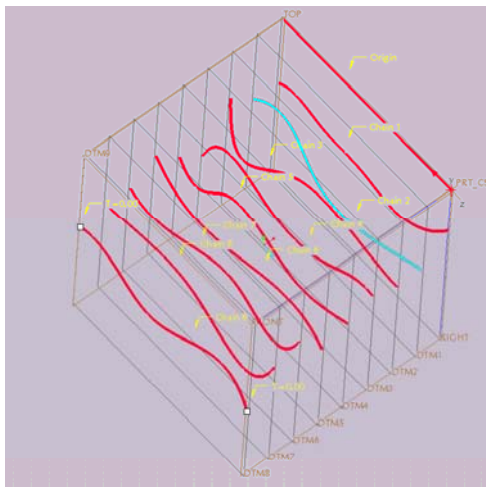
Tutorial - Definition and Machining of Free-form Surfaces in Pro/ENGINEER



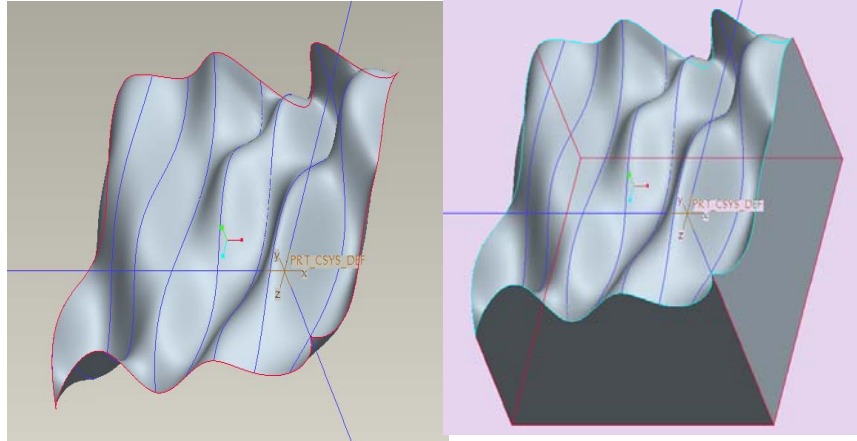
Results



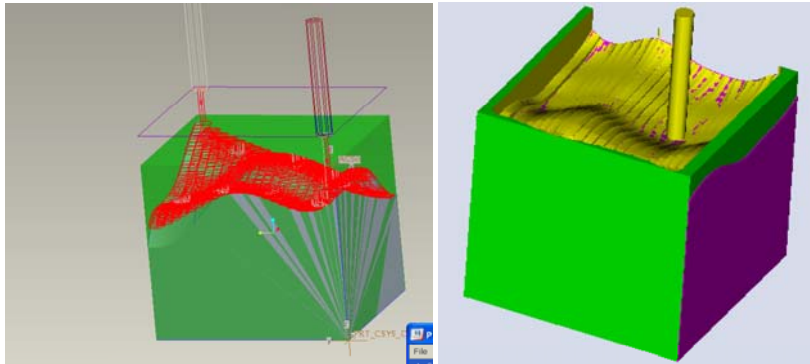
More Complex Shape



Surface and Solid



CNC Machining



Issues of Curved Surface Machining:

- Productivity
- Accuracy (mismatch of cutter and surface geometry - gouging and cusps)