On your own, try to work though freeing up a curvature constraint. (+DEFORM +FREE+CURVAT)

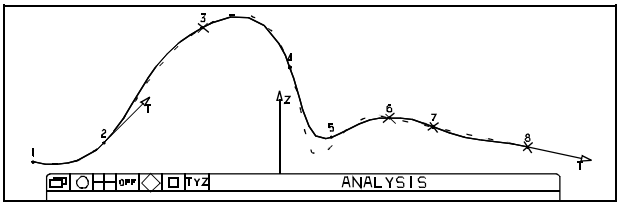
Select one point (with a curvature constraint) and hit YES to free the current point only. Or, by selecting a second point, the curvature constraints in the zone limited by the two selected points will be freed.

Always take the time to review your analysis window before making any changes. If a small area or just one point appears to be your culprit, consider working in this area first. Also, be realistic about your data.

While you may use these spline editing capabilities occasionally, you will get the most use out of being able to globally free up constraint points in a spline. A good example is when you are trying to digitize a curve or surface into CATIA. The accuracy of the digitizer is a good place to start when picking out a tolerance for smoothing out your splines.

12 Globally Freeing Constraint Points

Let's take a quick look at using the +GLOBAL option to free up all the points by deleting all the associated constraints and assigning a tolerance to smooth out the spline.



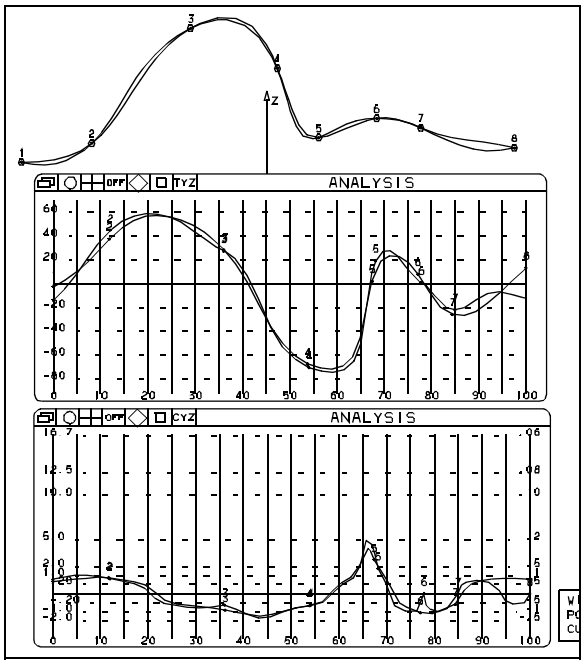
SPLINE +DEFORM+FREE+GLOBAL

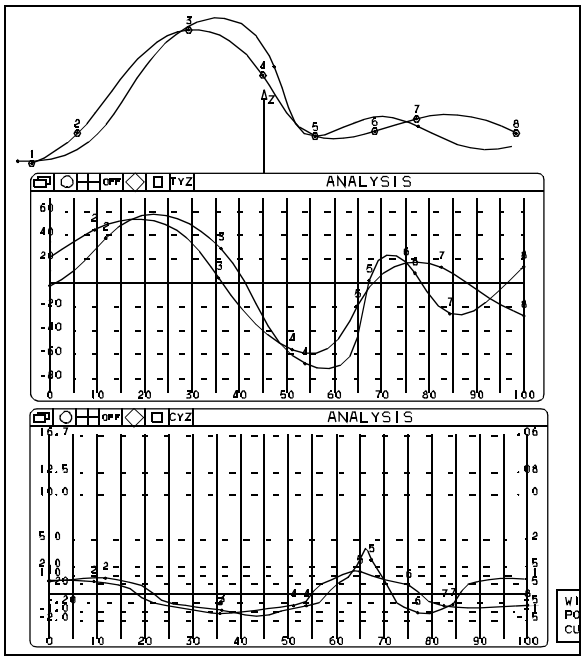
{ SEL 1RST CST PT // YES:CUR PT }
Select the 1st constraint point at the beginning of the spline.

{ SEL 2ND CST PT // KEY TOL }
Select the last constraint point at the opposite end. In our example, this is constraint number 8.

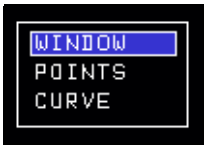
{ KEY TOL // YES:STD }
Key in " .2 ".

{ SEL 1RST CST PT // YES:ITER }
You can iterate the computation by hitting YES.





In the second figure, we have iterated the computation by hitting YES. Note that when using the global option, all the tangency and curvature constraints are freed in the relevant zone.



Let us mention another thing before we leave SPLINE. Remember how we selected >WINDOW< in the commands window to bring up the dialogue window and then defined the curvature and tangency windows? What if we want a different analysis window or would like to delete a window?

Select >WINDOW< again and key in the type of window you want. Two windows at most are available simultaneously (the >WINDOW< menu turns yellow and is unpickable). If you just want to delete a window, select its identifier (CYZ) in the pop up window and hit YES to delete (check out the prompt { KEY: NEW TYPE // YES: DELETE }). To change the type of window, select its identifier (CYZ) and then key in a new type.

For a more detailed description of the analysis window, see the reference manuals.

13 Definition of A, B, C and D-type Splines

The splines that we have been creating in this chapter have all been created in 2D where the YES:PARAMETRIZED option was taken. In CATIA, these splines are called b-type splines. For reference purposes (in case someone asks you), there are four types of splines:

- a-type splines are created in 3D SPACE mode where the parameter must be the curve coordinate. A curvature condition can only be imposed on a constraint that has a previously imposed tangency.
- b-type splines are created in 2D SPACE mode where the parameter used for creating the spline is the curve coordinate.
- c-type splines are created in 2D SPACE mode where the parameter used for creating the spline is the coordinate along an axis (X, Y, or Z).
- d-type splines are created in 3D SPACE mode where the associated constraint is defined on a surface and the spline lies on that surface. Only single patch surfaces can be used as the parent surface and imposing a curvature is not allowed.

We rarely use splines unless we are working with digitized data. It seems as though you spend all your time trying to smooth them. There should be an easier way to build smooth curves in CATIA, and there is . . .