Spline based techniques to make any parametric curve/surface editable

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Any parametric curve or surface where the formula is based on polynomials, rational functions, trigonometric functions, exponential functions, logarithmic functions, etc. can be made editable by adding some simple structures. That is, we can easily change the shape of any curve or surface by adding a set of interpolation "points" with associated structures, which can then be moved, rotated and scaled.

The method is a special case of blending splines, [1, 2], where we add knot vectors that generate 1st-degree B-splines, but where the B-spline basic functions are smoothed with blending functions, [1, 3]. We then add some special coefficients, each of which is connected to knot values. These coefficients are homogeneous matrices. Each of these represents a point, i.e. a position, and a set of associated local coordinate axes that form a local coordinate system.

The construction and implementation will be explained in more detail and many examples will be given.

References

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