Local geometry and parametrization of curves using Frenet coordinates

Gábor Valasek

Department of Algorithms and Their Applications, Eötvös Loránd University

valasek@inf.elte.hu

Parametric curves and surfaces represent shapes as the images of mappings. Certain applications, however, require the quantitative separation of the properties of the actual mapping from that of the geometry of the shape. Taking advantage of this can result in curve construction methods that offer a very high approximation order [**?**].

This talk presents an elementary differential geometric formulation to carry out this distinction on the derivatives of the curve in the three dimensional Euclidean space. We show how Frenet coordinates of the derivatives can be used to compute the geometric invariants of the curve and the derivatives of the parametric speed function.

We also show how to apply the above results to formulate a general geometric Hermite interpolation problem and study its solvability in a basis independent manner.

References

[1] *C. de Boor, K. Höllig, M. Sabin*: High accuracy geometric hermite interpolation. Computer Aided Geometric Design, 1987;4(4):269-78.