SUBDIVISION SCHEMES FOR NETS OF CURVES AND THEIR ANALYSIS BY PROXIMITY

C. Conti, N. Dyn, O. Elisha, D. Levin

University of Florence, Italy
Tel Aviv University, Israel

Abstract

In this talk we consider subdivision schemes for net of curves, *i.e.* iterative procedures which repeatedly refine nets of curves in R^3 and generate a smooth limit surface.

As well known, subdivision schemes refining points are efficient iterative means to generate recursively denser and denser sequences of points. At each step of the subdivision recursion a new sequence of points is obtained by weighted averages of topologically neighboring points previously determined. Similarly, subdivision schemes refining nets are efficient iterative procedures for generating recursively denser and denser nets of curves convergent to at least a continuous surface.

The schemes we here consider can be *primal* or *dual* subdivision schemes for net of curves according to the fact that, at each recursion step, the grid lines in the parameter space are unchanged or shifted, respectively. An example of primal subdivision scheme is an interpolatory scheme based on the four point scheme given in [3] while the BBCC subdivision schemes given in [1] and in [2] are instances of the second type.

The convergence analysis and the smoothness analysis of both, primal and dual schemes, is conducted by *promixity* with a C^1 subdivision scheme refining points.

References

[1] C. Conti, N. Dyn, Blending Based Chaikin type Subdivision Schemes for Nets of Curves, Mathematical Methods for Curves and Surfaces: Tromsø 2004, M. Dæhlen, K. Mørken, and L. Schumaker (eds.) pp.101–117, (2005)

[2] C. Conti and N. Dyn, Blending Based Corner Cutting Subdivision Scheme for Nets of Curves, submitted, (2009)

[3] O. Elisha, D. Levin, Preliminary Results.