

Povzetek

V diplomskem delu se bomo posvetili pogojem, ki so potrebni in zadostni, da je zlepek iz krivulj ali ploskev geometrijsko zvezen poljubnega reda. Poudarek je na regularnosti v stičnih točkah in pogojih, ki morajo biti zadoščeni. Pogoje, ki jih bomo izpeljali, bomo uporabili na Bézierovi reprezentaciji krivulj in ploskev. Za Bézierove krivulje in ploskve bomo pogledali še nekaj zanimivih lastnosti in zvez. Problem Bézierovih zlepkov na koncu predstavimo še na konkretnih primerih.

This thesis will focus on conditions that are necessary and sufficient so the patch of curves or surfaces is geometric continuous of arbitrary order. Emphasis is placed on the regularity at the point where patches meet and on the compatibility conditions that must be satisfied in this case. We will look at some interesting properties and relationships for geometric continuity of Bézier curves and surfaces. Finally, some examples will be given.

Math. Subj. Class. (MSC 2000): 41A10, 65D17, 68U07

Ključne besede:

geometrijska zveznost, parametrična zveznost, CAGD, Bézierove krivulje, Bernsteinovi polinomi

Keywords:

geometric continuity, parametric continuity, computer aided geometric design, Bézier curves, Bernstein polynomials

Literatura

- [1] B. A. Barsky, A. D. DeRose. Three characterizations of geometric continuity for parametric curves. Technical report, Berkeley, CA, 1988.
- [2] E. H. Doha, A. H. Bhrawy in M. Saker. On the derivatives of Bernstein polynomials: An application for the solution of high even-order differential equations. *Boundary Value Problems*, 2011.
- [3] A. Down. The Frenet-Serret theorem. Skripta, dosegljiva na: <http://www.ocf.berkeley.edu/~adriand/classes/files/m140/4.pdf>.
- [4] G. Farin. *Curves and surfaces for CAGD: a practical guide*. Morgan Kaufmann Publishers Inc., San Francisco, CA, 5. izdaja, 2002.
- [5] I. D. Faux, M. J. Pratt. *Computational Geometry for Design and Manufacture*. Halsted Press, New York, 1979.
- [6] H. Hagen. Bézier-curves with curvature and torsion continuity. *The Rocky Mountain Journal of Mathematics*, 16:629–638, 1986.
- [7] S. Krantz, H. Parks. *A primer of real analytic functions*. Birkhäuser, New York, 2. izdaja, 2002.
- [8] J. Peters. Geometric continuity. *Handbook of Computer Aided Geometric Design*, Elsevier, strani 193–229, 2002.
- [9] L. Piegl, W. Tiller. *The NURBS book (2nd ed.)*. Springer-Verlag New York, Inc., 1997.
- [10] X. Ye, Y. Liang in H. Nowacki. Geometric continuity between adjacent Bézier patches and their constructions. *Computer Aided Geometric Design*, 13:521–548, avgust 1996.
- [11] J. Zheng, G. Wang in Y. Liang. GC^n continuity conditions for adjacent rational parametric surfaces. *Computer Aided Geometric Design*, 12:111–129, marec 1995.
- [12] E. Žagar. Interpolacija s parametričnimi polinomskimi krivuljami. Skripta, dosegljiva na: <http://ucilnica.fmf.uni-lj.si/mod/resource/view.php?id=10759>.