

Bézier type curves generated by some class of positive linear operators

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ABSTRACT.

In this paper, we will consider the Bézier type curves in which the fundamental Bernstein basis will be replaced with other function sequences. For all the applications the graphic representation will be done for the same ordinates of the control points. In the first example, we consider Bézier type curves generated by fundamental Bernstein polynomials and "classical" nodes $x_{m,k} = \frac{k}{m}$ and also with "changed" nodes $y_{m,k} = \frac{\sqrt{k(k+1)}}{m}$, where $m = 3$ and $k \in \{0, 1, 2, 3\}$. In the second example, we consider Bézier type curves generated by fundamental Bleimann-Butzer-Hahn polynomials and "classical" nodes $x_{m,k} = \frac{k}{m+1-k}$ and also with "changed" nodes $y_{m,k} = \frac{\sqrt{(m^2-1)k}}{m^2(m+1-k)}$, where $m = 3$ and $k \in \{0, 1, 2, 3\}$. In each example, the "classical" and "changed" points are "close". The obtained curves in each example are plotted in the same figure.

REFERENCES

- [1] Agratini, O., *Aproximare prin operatori liniari*, Presa Universitară Clujeană, Cluj-Napoca, 2000 (Romanian)
- [2] Ahn, Y. J., Kim, H. O. and Lee, K. Y., *G1 arc spline approximation of quadratic Bézier curves*, Computer-Aided Design, **30** (1998), No.8, 615-620
- [3] Bleimann, G., Butzer, P. L. and Hahn, L. A., *Bernstein-type operator approximating continuous functions on the semi-axis*, Indag. Math. **42** (1980), 255-262
- [4] Bernstein, S. N., *Démonstration du théorème de Weierstrass fondée sur le calcul de probabilités*, Commun. Soc. Math. Kharkow **13** (1912-1913), No. 2, 1-2
- [5] Pișcoran, L. I., *Elemente de geometrie computațională*, Editura Risoprint, Cluj-Napoca, 2008 (Romanian)
- [6] Pop, O. T. and Fărcaș, M. D., *About a class of linear positive operators obtained by choosing the nodes*, J. Inequal. Pure Appl. Math. **10** (2009), No. 1, Art.30, 9pp
- [7] Riskus A., *Approximation of a cubic Bézier curve by circular arcs and vice versa*, Inf. Tech. and Control **35** (2006), No. 4
- [8] Stancu, D. D., Coman, Gh., Agratini, O. and Trîmbițaș, R., *Analiză numerică și teoria aproximării*, I, Presa Universitară Clujeană, Cluj-Napoca, 2001 (Romanian)
- [9] Walton, D. J. and Meek, D. S., *Approximation of quadratic Bézier curves by arc splines*, Comput. Appl. Math. **54** (1994), 107-120

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