

q -Bernstein bases and q -Bézier curves

Héctor Orera¹, Jorge Delgado¹, Juan Manuel Peña¹,

SUMMARY

The q -Bernstein basis of univariate polynomials, $0 < q \leq 1$, was introduced by Phillips in [2]. This basis has played an important role in several fields such as Computer Aided Geometric Design (CAGD), Approximation Theory or Quantum Calculus and they have received a lot of attention in recent research (see [1, 3], and references therein). This basis contains the classical basis of Bernstein polynomials for the particular case $q = 1$.

In this talk, we will review some important properties of q -Bézier curves and of q -Bézier polynomials. Evaluation algorithms will be presented and an extension for the design of surfaces will also be introduced.

Keywords: q -Bernstein; q -Bézier; corner cutting algorithm

AMS Classification: 41A10, 65D17

References

- [1] R. GOLDMAN, P. SIMEONOV AND Y SIMSEK. Generating functions for the q -Bernstein bases. *SIAM J. Discrete* **28**, 1009–1025, 2014.
- [2] G.M. PHILLIPS. Bernstein polynomials based on the q -integers. *Ann. Numer. Math.* **4**, 511–518, 1997.
- [3] P. SIMEONOV, V. ZARIS AND R. GOLDMAN. q -Blossoming. A new approach to algorithms and identities for q -Bernstein bases and q -Bézier curves. *J. Approx. Theory* **164**, 77–104, 2012.

¹Departamento de Matemática Aplicada / IUMA

Universidad de Zaragoza

email: hectororera@unizar.es, jorgedel@unizar.es, jmpena@unizar.es