Linear-time geometric algorithm for evaluating Bézier curves

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Abstract

A new algorithm for computing a point on a polynomial or rational curve in Bézier form is proposed. The method has a geometric interpretation and uses only convex combinations of control points. The new algorithm's computational complexity is linear with respect to the number of control points and its memory complexity is $O(1)$. Some remarks on similar methods for surfaces in rectangular and triangular Bézier form are also given.

Keywords: Bernstein polynomials; Bézier curves; Bézier surfaces; Convex hull property; Geometric algorithms; Linear complexity.

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