Efficient evaluation of Bernstein-Bézier coefficients of B-spline basis functions over one knot span

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Abstract

New differential-recurrence relations for B-spline basis functions are given. Using these relations, a recursive method for finding the Bernstein-Bézier coefficients of B-spline basis functions over a single knot span is proposed. The algorithm works for any knot sequence which guarantees that all B-spline functions are at least C^0-continuous. It has good numerical behavior and has an asymptotically optimal computational complexity.

Keywords: B-spline basis functions, Bernstein-Bézier form, recurrence relations, B-spline curves, B-spline surfaces, de Boor-Cox algorithm.

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