Efficient merging of multiple segments of Bézier curves

Paweł Woźny*, Przemysław Gospodarczyk, Stanisław Lewanowicz

Institute of Computer Science, University of Wrocław, ul. Joliot-Curie 15, 50-383 Wrocław, Poland

Abstract

This paper deals with the merging problem of segments of a composite Bézier curve, with the endpoints continuity constraints. We present a novel method which is based on the idea of using constrained dual Bernstein polynomial basis (P. Woźny, S. Lewanowicz, Comput. Aided Geom. Design 26 (2009), 566–579) to compute the control points of the merged curve. Thanks to using fast schemes of evaluation of certain connections involving Bernstein and dual Bernstein polynomials, the complexity of our algorithm is significantly less than complexity of other merging methods.

Keywords: Composite Bézier curve, constrained dual Bernstein basis, merging, multiple segments, $C^{k,l}$ continuity.

*Corresponding author. Fax +48 71 3757801

Email addresses: Pawel.Wozny@ii.uni.wroc.pl (Paweł Woźny), pgo@ii.uni.wroc.pl (Przemysław Gospodarczyk), Stanislaw.Lewanowicz@ii.uni.wroc.pl (Stanisław Lewanowicz)