Applications of Lupas *q*-analogue of Bernstein Operator in Geometric Design

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Bernstein polynomials and Bézier curves/surfaces are of fundamental importance for Computer Aided Geometric Design (CAGD). Recently, the rapid development of quantum calculus has led to the discovery of new generalizations of q-analogue and h-analogue of Bernstein operators. Lupas q-analogue Bernstein operator, the first generalized Bernstein operator based on q-calculus, is one of the most popular q-versions of Bernstein operator, which have been studied and successfully used in the field of approximation theory and CAGD. In this talk, the applications of Lupas q-analogue Bernstein operator in curve/surface modeling will be discussed. New generalizations of discrete probability model and discrete convolution structure based on Lupas q-analogue Bernstein operator are introduced, and corresponding linear evaluation algorithms are presented. Moreover, Lupas q-analogue Bernstein operator is used to implement more stable barycentric rational interpolation.

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