Electronic Transactions on Numerical Analysis.
Volume 26, pp. 312-319, 2007.

ISSN 1068-9613.

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POLYNOMIAL BEST CONSTRAINED DEGREE REDUCTION IN STRAIN ENERGY*

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Abstract. We exhibit the best degree reduction of a given degree n polynomial by minimizing the strain energy of the error with the constraint that continuity of a prescribed order is preserved at the two endpoints. It is shown that a multidegree reduction is equivalent to a step-by-step reduction of one degree at a time by using the Fourier coefficients with respect to Jacobi orthogonal polynomials. Then we give explicitly the optimal constrained one degree reduction in Bézier form, by perturbing the Bézier coefficients.

Key words. reduction, polynomials, approximation, Bézier curves

AMS subject classifications. 41A10, 65D05, 65D17

*Received July 12, 2006. Accepted for publication February 12, 2007. Recommended by M. Gutknecht.
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