

BIVARIATE INTERPOLATION AT XU POINTS: RESULTS, EXTENSIONS AND APPLICATIONS*

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Dedicated to Ed Saff on the occasion of his 60th birthday

Abstract. In a recent paper, Y. Xu proposed a set of Chebyshev-like points for polynomial interpolation on the square $[-1, 1]^2$. We have recently proved that the Lebesgue constant of these points grows like \log^2 of the degree (as with the best known points for the square), and we have implemented an accurate version of their Lagrange interpolation formula at linear cost. Here we construct non-polynomial Xu-like interpolation formulas on bivariate compact domains with various geometries, by means of composition with suitable smooth transformations. Moreover, we show applications of Xu-like interpolation to the compression of surfaces given as large scattered data sets.

Key words. bivariate polynomial interpolation, Xu points, Lebesgue constant, domains transformations, generalized rectangles, generalized sectors, large scattered data sets, surface compression

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