Multivariate Newton interpolation by numerical linear algebra *

Stefano De Marchi
Department of Pure and Applied Mathematics
University of Padova
Via Trieste, 63 - 35121 Padova, Italy
email: demarchi@math.unipd.it

Dedicated to Robert Schaback in the occasion of his 65th birthday

Abstract

This work arose from a couple of papers by R. Schaback and co-authors (cf. [3, 4]), in which, among other things, was pointed out that the Newton basis is a useful basis for overcoming the ill conditioning of linear system arising from radial basis or kernel techniques. In this talk we present a way of computing the multivariate divided differences and the polynomial Newton interpolation by means of numerical linear algebra techniques, based on *Discrete Leja Points* extracted from *(Weakly) Admissible Meshes* (WAM) (cf. [2]) of two and three dimensional domains (cf. [1]). An empirical error estimation on the WAM is also derived.

References

[1] L. Bos, S. De Marchi, A. Sommariva and M. Vianello, *Computing multivariate Fekete and Leja points by numerical linear algebra*, to appear in SIAM J. Numer. Anal. (2010) (preprint online at: http://www.math.unipd.it/∼demarchi/publications.html).

[2] J. P. Calvi and N. Levenberg, *Uniform approximation by discrete least squares polynomials*, J. Approx. Theory 152 (2008), 82–100.

[3] De Marchi, S. and Schaback, R. *Nonstandard Kernels and their Applications*, Dolomites Research Notes on Approximation, 2 (2009), 16–43.

[4] Müller, S. and Schaback, R. *Newton Basis for Kernel Spaces*, J. Approx. Theory, 161 (2009), 645–655.

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