

Hermite Birkhoff interpolation of scattered data by combined Shepard operators

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Abstract

Methods approaching the problem of the Hermite Birkhoff interpolation of scattered data by combining Shepard operators with local interpolating polynomials are not new in literature [1–4].

In [3] combinations of Shepard operators with bivariate Hermite-Birkhoff local interpolating polynomials are introduced to increase the algebraic degree of precision (polynomial reproduction degree) of Shepard operators. These polynomials are of total degree and must interpolate the Hermite-Birkhoff data in proper subsets of the data set; the definition of such sets requires some ordering of the node set to be fixed.

In [1] the most general problem of Hermite-Birkhoff interpolation of scattered data is solved, but the interpolant could have low algebraic degree of precision or even have not any algebraic degree of precision, for example in the case when in some node the value of the function is unknown. This lack badly affects the accuracy of the approximation of the combination in that cases.

The method here proposed, obtained by combining Shepard operators with three point Hermite - Birkhoff interpolation polynomials, is an attempt to overcome the weaknesses of the aforesaid methods. Methods [2,4] are particular cases of this new general procedure.

References

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