On the improvement of the triangular Shepard method by non conformal elements

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Most classical numerical methods for approximation of a multivariate function (or integrals of it) use function values at sample points. However, as shown in [2, 3], in many practical problems, the available data are not restricted by function evaluations, but contain several integrals over certain hyperplane sections, or, more generally, over smooth surfaces in $\mathbb{R}^d$. In such cases, generalizations of the existing theory and algorithms of approximation operators are required, which are based on the enriched set of data. In this work, we focus on this problem in the two dimensional case, in the setting of scattered data. More precisely we construct new Shepard type approximation operators, based on new enrichments of the standard linear triangular element, using polynomial functions. In line with previously considered improvements of the triangular Shepard method [4, 5], these enriched triangular elements will be blended by using triangular Shepard basis functions [1]. Numerical results are provided.

References

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