

**Alfeld, Peter**

**A trivariate Clough-Tocher scheme for tetrahedral data.** (English) Zbl 0566.65003  
Comput. Aided Geom. Des. 1, 169-181 (1984).

The author considers a three-dimensional domain which is tessellated into tetrahedra. He constructs a  $C^1$  interpolant for  $C^2$  data, that is a generalization of the well-known bivariate Clough-Tocher scheme. The interpolant is local, piecewise polynomial and has cubic precision. Some computational aspects are discussed.

Reviewer: [V.V.Vasil'ev](#)

**MSC:**

- [65D05](#) Numerical interpolation
- [41A05](#) Interpolation in approximation theory
- [41A63](#) Multidimensional problems (should also be assigned at least one other classification number from Section 41-XX)

Cited in **3** Reviews  
Cited in **31** Documents

**Keywords:**

[Clough-Tocher scheme](#); [scattered data](#); [trivariate interpolation](#); [tetrahedral interpolation](#)

**Software:**

[REDUCE](#)

**Full Text:** [DOI](#)

**References:**

- [1] Alfeld, P., A discrete  $C^1$  interpolant for tetrahedral data, Rocky mountain J. math., 14, 1, 5-16, (1984) · [Zbl 0566.65004](#)
- [2] Alfeld, P., Multivariate perpendicular interpolation, SIAM J. numerical analysis, (1984), to appear · [Zbl 0588.65004](#)
- [3] Alfeld, P., Multivariate scattered data derivative generation by functional minimization, (1984), submitted for publication
- [4] Alfeld, P., A trivariate clough—tocher scheme for tetrahedral data, () · [Zbl 0566.65003](#)
- [5] Alfeld, P.; Harris, B., MICROSCOPE: A software system for multivariate analysis, (1984), submitted for publication
- [6] Barnhill, R.E.; Farin, G.,  $C^1$  quintic interpolation over triangles: two explicit representations, Int. J. for num. meth. in eng., 17, 1763-1778, (1981) · [Zbl 0477.65009](#)
- [7] Barnhill, R.E.; Little, F.F., Three- and four-dimensional surfaces, Rocky mountain J. math., 14, 77-102, (1984) · [Zbl 0552.65008](#)
- [8] Farin, G., Smooth interpolation to scattered 3D data, ()
- [9] Farin, G., Bézier polynomials over triangles, ()
- [10] Hearn, A.C., (), Version 3.0, Rand Publication CP78 (4/83)
- [11] Strang, G.; Fix, G.J., An analysis of the finite element method, (1973), Prentice Hall Englewood Cliffs, NJ · [Zbl 0278.65116](#)
- [12] Ženišek, A., Polynomial approximation on tetrahedrons in the finite element method, J. approx. theory, 7, 334-351, (1973) · [Zbl 0279.41005](#)

This reference list is based on information provided by the publisher or from digital mathematics libraries. Its items are heuristically matched to zbMATH identifiers and may contain data conversion errors. It attempts to reflect the references listed in the original paper as accurately as possible without claiming the completeness or perfect precision of the matching.