

A 3D pyramid spline element

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Abstract

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Abstract In this paper, a 13-node pyramid spline element is derived by using the tetrahedron volume coordinates and the B-net method, which achieves the second order completeness in Cartesian coordinates. Some appropriate examples were employed to evaluate the performance of the proposed element. The numerical results show that the spline element has much better performance compared with the isoparametric serendipity element Q20 and its degenerate pyramid element P13 especially when mesh is distorted, and it is comparable to the Lagrange element Q27. It has been demonstrated that the spline finite element method is an efficient tool for developing high accuracy elements.

Keywords: Spline finite element Pyramid element The second order completeness B-net method

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