Abstracts

Higher-Order Vector Finite Elements for Tetrahedral Cells

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Edge-based vector finite elements are widely used for two-dimensional (2-D) and three-dimensional (3-D) electro-magnetic modeling. This paper seeks to extend these low-order elements to higher orders to improve the accuracy of numerical solutions. These elements have relaxed normal-component continuity to prohibit spurious modes, and also satisfy Nedelec's constraints to eliminate unnecessary degrees of freedom while remaining entirely local in character. Element matrix derivations are given for the first two vector finite element sets. Also, results of the application of these basis functions to cavity resonators demonstrate the superiority of the higher-order elements.

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