Abstracts

On the FEM treatment of wedge singularities in waveguide problems

J.S. Juntunen and T.D. Tsiboukis. "On the FEM treatment of wedge singularities in waveguide problems." 2000 Transactions on Microwave Theory and Techniques 48.6 (Jun. 2000 [T-MTT] (Mini-Special Issue on the 1999 IEEE Radio and Wireless Conference (RAWCON))): 1030-1037.

This paper introduces a novel extension to a scalar two-dimensional polynomial finite-element basis to better cope with wedge singularities in waveguide problems. An error estimate for the computed cutoff frequencies of the waveguide shows that the relative H^1 error of the modal solution is critical. We demonstrate that the present extension significantly improves the approximation properties of a polynomial basis, especially in the H^1 norm. Numerical examples show that the present extension compares well with other recent techniques. Combining variable order elements with singular basis extension provides further significant reduction of the computational burden.

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