

MATLAB and C Programming for Trefftz Finite Element Methods

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Abstrak

Although the Trefftz finite element method (FEM) has become a powerful computational tool in the analysis of plane elasticity, thin and thick plate bending, Poisson's equation, heat conduction, and piezoelectric materials, there are few books that offer a comprehensive computer programming treatment of the subject. Collecting results scattered in the literature, MATLAB® and C Programming for Trefftz Finite Element Methods provides the detailed MATLAB® and C programming processes in applications of the Trefftz FEM to potential and elastic problems.

The book begins with an introduction to the hybrid-Trefftz (HT) FEM that covers basic concepts and general element formulations of the method. It then concentrates on both the essentials and subroutines of MATLAB and C programming. The next few chapters present applications of T-elements to potential problems and linear plane elasticity, discuss how to solve body force in elasticity through radial basis functions, and examine how special purpose functions can be constructed. The final chapter explores advanced topics, such as the construction of Trefftz p-elements, dimensionless transformation, and an alternative formulation to HT FEM.