C. A. Brebbia
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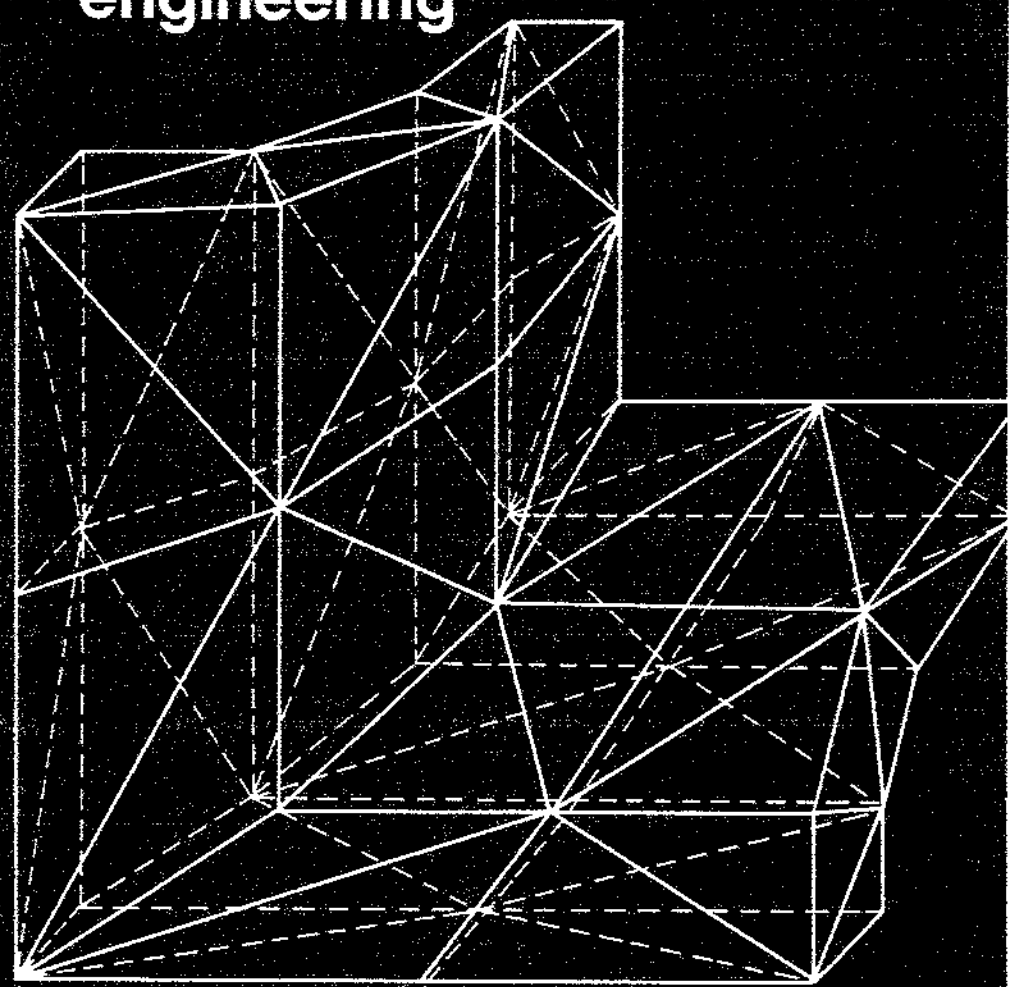
Boundary element techniques in engineering



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Preface

The boundary element method originated at Southampton University from previous work on classical integral equations and finite elements. The new method has the advantages of both techniques, that is, it reduces the dimensions of the problem by one as boundary integral equations and it allows for complex surface elements to define the external surface of the domain. It represents an advance over classical finite elements and overcomes many of the main disadvantages such as the difficulty of defining with accuracy domains extending to infinity, having to solve large systems of equations and the need to define complicated data structure.

The method is ideally suited to the solution of many two- and three-dimensional problems in elasticity and potential theory for which finite elements, although popular, are inefficient. In the authors' opinion, finite elements are appropriate for problems such as shells, highly anisotropic media, some non-linear and convective problems but their applicability to a wide range of problems has been overstated. This is doubtless due to the energy of finite element researchers as well as to the coincidental appearance of the method with the development of the first generation of powerful computers. The authors are also aware that the boundary element may not appeal to present-day finite element-oriented engineers and consequently dedicate this book to the coming generation with the warning that they should never take any written work as definitive. Therefore we not only expect but clearly hope that this book will be superseded in due course and that, when this happens, we shall be able to bow gracefully rather than enter into fruitless argument.

It is suggested that readers who wish to have an introduction to boundary elements and a basic knowledge of how boundary element programs are developed should refer to the main author's earlier book, *The Boundary Element Method for Engineers* (Pentech Press, London, 1978).

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