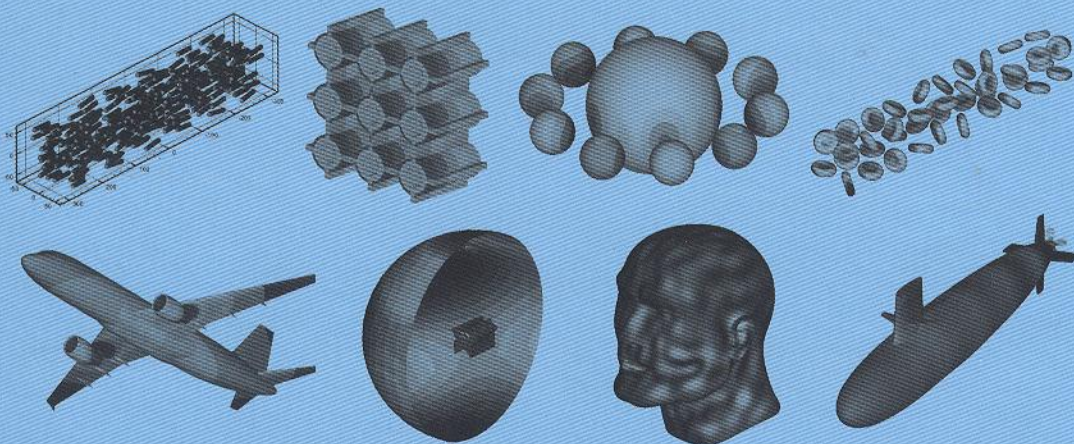


Fast Multipole Boundary Element Method

Theory and Applications in Engineering



Yijun Liu

CAMBRIDGE

The fast multipole method is one of the most important algorithms in computing developed in the 20th century. Along with the fast multipole method, the boundary element method (BEM) has also emerged as a powerful method for modeling large-scale problems. BEM models with millions of unknowns on the boundary can now be solved on desktop computers using the fast multipole BEM. This is the first book on the fast multipole BEM, which brings together the classical theories in BEM formulations and the recent development of the fast multipole method. Two- and three-dimensional potential, elastostatic, Stokes flow, and acoustic wave problems are covered, supplemented with exercise problems and computer source codes. Applications in modeling nanocomposite materials, biomaterials, fuel cells, acoustic waves, and image-based simulations are demonstrated to show the potential of the fast multipole BEM. This book will help students, researchers, and engineers to learn the BEM and fast multipole method from a single source.

Dr. Yijun Liu has more than 25 years of research experience on the BEM for subjects including potential; elasticity; Stokes flow; and electromagnetic, elastic, and acoustic wave problems, and he has published extensively in research journals. He received his Ph.D. in theoretical and applied mechanics from the University of Illinois and, after a postdoctoral research appointment at Iowa State University, he joined the Ford Motor Company as a CAE (computer-aided engineering) analyst. He has been a faculty member in the Department of Mechanical Engineering at the University of Cincinnati since 1996. Dr. Liu is currently on the editorial board of the international journals *Engineering Analysis with Boundary Elements* and the *Electronic Journal of Boundary Elements*.

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