

Solid Mechanics and Its Applications 216  
Series Editors: J. R. Barber and Anders Klarbring

M. Reza Eslami

## Finite Elements Methods in Mechanics

This book covers all basic areas of mechanical engineering, such as fluid mechanics, heat conduction, beams, and elasticity with detailed derivations for the mass, stiffness, and force matrices. It is especially designed to give physical feeling to the reader for finite element approximation by the introduction of finite elements to the elevation of elastic membrane. A detailed treatment of computer methods with numerical examples are provided. In the fluid mechanics chapter, the conventional and vorticity transport formulations for viscous incompressible fluid flow with discussion on the method of solution are presented. The variational and Galerkin formulations of the heat conduction, beams, and elasticity problems are also discussed in detail. Three computer codes are provided to solve the elastic membrane problem. One of them solves the Poisson's equation. The second computer program handles the two dimensional elasticity problems, and the third one presents the three dimensional transient heat conduction problems. The programs are written in C++ environment.

Engineering

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