Finite Element Programs in Structural Engineering and Continuum Mechanics. Woodhead Publishing Series in Civil and Structural Engineering

Description: Bridging the gap between theoretical texts and the massive and expensive software packages, this handbook covers finite element programming in a wide range of problems in mechanical, civil, aeronautical and electrical engineering. Comprehensive, it ranges from the static analysis of two- and three-dimensional structures to stress analysis of thick slabs on elastic foundations, and from two- and three-dimensional vibration analysis problems to two-dimensional field problems including heat transfer and acoustic vibrations.

The 24 printouts of powerful and valuable engineering computer programs, written in QUICK BASIC, are introduced by a preliminary chapter giving useful hints and formulae intended for structural design. The programs are capable of analysing problems in engineering design and manufacture, with text fully describing how to use the computer programs for their particular problems or tasks. The finite element method is used in all the programs, and the problems for analysis can be of quite complex design and shape and with complex boundary conditions.

- Covers finite element programming in a wide range of problems in mechanical, civil, aeronautical and electrical engineering
- Ranges from the static analysis of two- and three-dimensional structures to stress analysis of thick slabs on elastic foundations

Contents:
- Forces in plane pin-jointed trusses
- Bending moments in beams
- Bending moments in rigid-jointed plane frames
- Forces in pin-jointed space trusses
- Static analysis of three dimensional rigid-jointed frames
- Vibration of rigid-jointed space frames
- Bending moments in grillages
- Vibration of grillages
- Slab on elastic foundation
- In-plane stresses in plates
- Bending stress in flat plates
- Stresses in doubly-curved shells
- In-plane vibrations of plates
- Lateral vibrations of flat plates
- Vibration of thin-walled, Doubly-curved shells
- Stresses in solids
- Two dimensional field problems
- Solution of Helmholtz's equation
- References and 24 appendices containing computer programs.

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