Ferreira

MATLAB Codes for Finite Element Analysis

Solids and Structures

This book intend to supply readers with some MATLAB codes for ?nite element analysis of solids and structures. After a short introduction to MATLAB, the book illustrates the ?nite element implementation of some problems by simple scripts and functions. The following problems are discussed: • Discrete systems, such as springs and bars • Beams and frames in bending in 2D and 3D • Plane stress problems • Plates in bending • Free vibration of Timoshenko beams and Mindlin plates, including laminated composites • Buckling of Timoshenko beams and Mindlin plates The book does not intends to give a deep insight into the ?nite element details, just the basic equations so that the user can modify the codes. The book was prepared for undergraduate science and engineering students, although it may be useful for graduate students. TheMATLABcodesofthisbookareincludedinthedisk.Readersarewelcomed to use them freely. The author does not guarantee that the codes are error-free, although a major e?ort wastaken to verify all of them. Users should use MATLAB 7.0 or greater when running these codes. Any suggestions or corrections are welcomed by an email to ferreira@fe.up.pt.

This book illustrates how MATLAB compact and powerful programming framework can be very useful in the finite element analysis of solids and structures. The book shortly introduces finite element concepts and an extensive list of MATLAB codes for readers to use and modify. The book areas range from very simple springs and bars to more complex beams and plates in static bending, free vibrations and buckling problems.
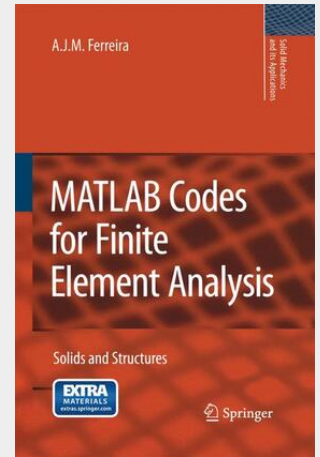
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