

Programs to accompany Finite Element Analysis and Programming: An Introduction

Finite Element Analysis and Programming: An Introduction

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All the programs described in the book can be downloaded from the publisher's website at http://narosa.com/books_display.asp?catgcode=978-81-7319-791-8. The programs are written to illustrate the basics of FEA and hence not optimal from the point of view of execution time and memory usage. The programs have been run on a few test cases. If any bugs are found in the programs, kindly report them to the publisher. Neither the author nor the publisher can be held responsible for any issues arising by using the programs.

The programs are written in MATHCAD (2001) and Microsoft Excel (2002). MATHCAD is a registered trademark of MathSoft Engineering & Education, Inc., and Microsoft Excel is a registered trademark of Microsoft Corporation.

The Mathcad and Excel programs files are stored in the directories given below.

Appendix A

Cholesky Decomposition.mcd

LU_decomposition.mcd

Appendix B

eigen_routines.mcd

Appendix C

DataOut.prn

MATHCAD 2001 v V12.1.mcd

MCAD intro.mcd

Chapter 03 Basic Steps in FEA

Ex. 3.2 Gauss Integration.mcd

Ex. 3.3 Global Stiffness Matrix Assembly.mcd

Ex. 3.8 Gauss Elimination.mcd

Chapter 05 Shape Functions

Ex. 5.1 TRIA3 Shape unctions.mcd

Chapter 06 Bar Elements

Bar_Element.xls

Ex. 6.1 1D Bar Element.mcd

Chapter 07 Truss Elements

Ex. 7.1 Truss_2D.mcd

Truss2D_Element.xls

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Chapter 08 Beam Elements

Euler_Beam_Element.xls
Ex. 8.1 Beam_2D.mcd
Ex. 8.2 Timoshenko_Beam.mcd
Numerical Integration.xls
Timoshenko_Beam_Element.xls

Chapter 09 Frame Element

Ex. 9.1 Frame_2D.mcd
Frame2D_Element.xls

Chapter 11 Triangle Membrane Elements

CST_membrane_Element.xls
Ex. 11.1 TRIA3M.mcd
Ex. 11.3 TRIA6M.mcd

Chapter 12 Quadrilateral Elements

Ex. 12.1 RECT4M.mcd
Ex. 12.2 QUAD4M.mcd
Ex. 12.3 Hour Glass Modes.mcd
Quad4_membrane_Element.xls

Chapter 13 Axisymmetric Elements

Ex. 13.2 TRIA3 Axi Symmetric.mcd
Tria3_Axisymmetric_Element.xls

Chapter 14 Tetrahedron Elements

Ex. 14.1 TETRA4.mcd
Tetra4_Solid_Element.xls

Chapter 15 Prism Element

Ex. 15.1 PRISM6.mcd
Prism6_Solid_Element.xls

Chapter 16 Hexahedron Elements

Ex. 16.1 HEXA8.mcd
Hexa8_Solid_Element.xls

Chapter 17 Plate Elements

Ex. 17.1 TRIA3P.mcd
Ex. 17.2 QUAD4P.mcd
Quad4_RM_thick_plate_Element.xls

Chapter 18 Composite Laminates

Composite_Quad4_RM_Thick_Plate_Element.xls

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Ex. 18.1 Composite QUAD4.mcd

Chapter 19 Dynamic Analysis

Dynamic_Analysis_Frame2D_Element.xls

Eigen_Solution_Frame2D_Element.xls

Ex. 19.4 Eigenvalues & Eigenvectors.mcd

Ex. 19.5 Modal Analysis.mcd

Ex. 19.6 Numerical Integration of ODE.mcd

Ex. 19.7 Mass Matrix Kirchoff TRIA3P.mcd

Ex. 19.9 Truss Structure.mcd

Chapter 20 FEA of Partial Differential Equations

Ex. 20.2 Thermal Analysis 1D.mcd

Ex. 20.3 Poisson's Eqn 2D.mcd

Ex. 20.4 Parabolic 1D.mcd

Ex. 20.5 Hyperbolic 1D.mcd

Poissons_Eqn_Q4_element.xls

Thermal_1D_analysis.xls