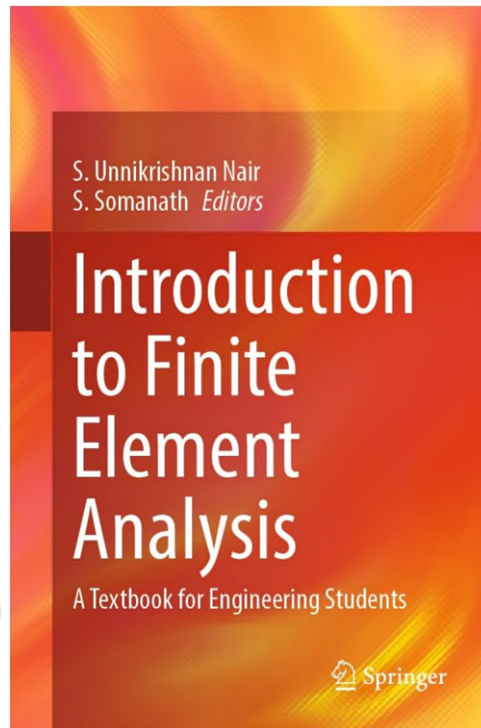# Coloured Figures and Illustrations

For

Introduction to Finite Element Analysis

The colour images in this file are for individual and personal use of readers of the textbook *Introduction to Finite Element Analysis*. All figures from the book are not reproduced in this file. Only figures and illustrations that require colour detail for enhanced comprehension are included here. This set of figures is not intended to be used as standalone resource. It must be used in conjunction with the textbook.
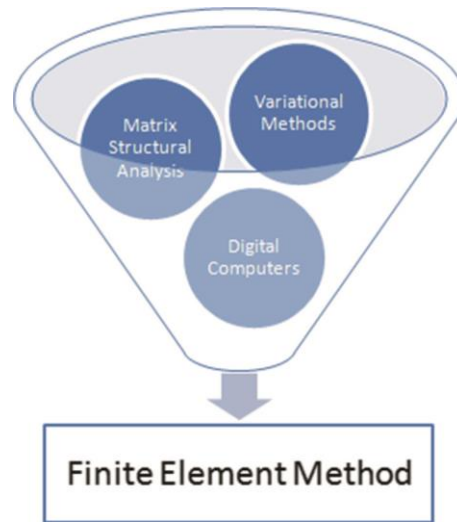
Chapter 1

Fig. 1.1 Finite element method—a confluence of three different domains

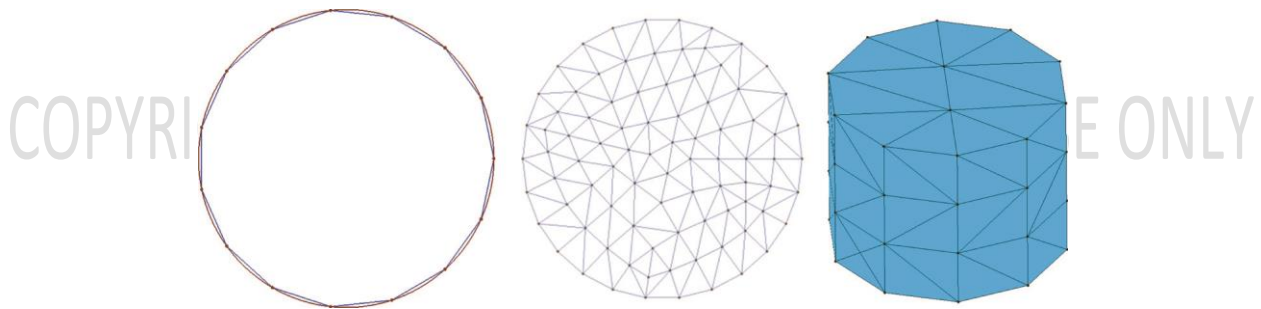**Fig. 1.2 Archimedes' concept of discretization with known geometries**

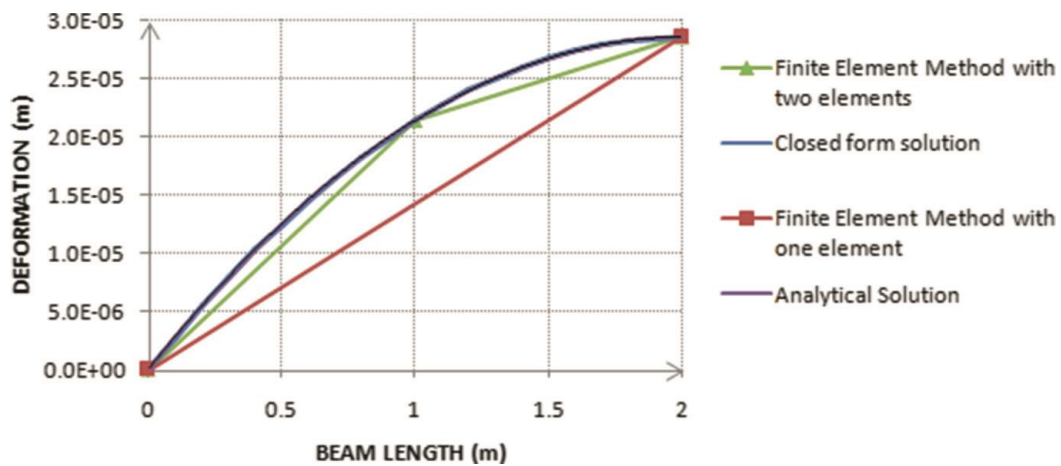**Fig. 1.7 Variation of u along the length of beam for different methods**
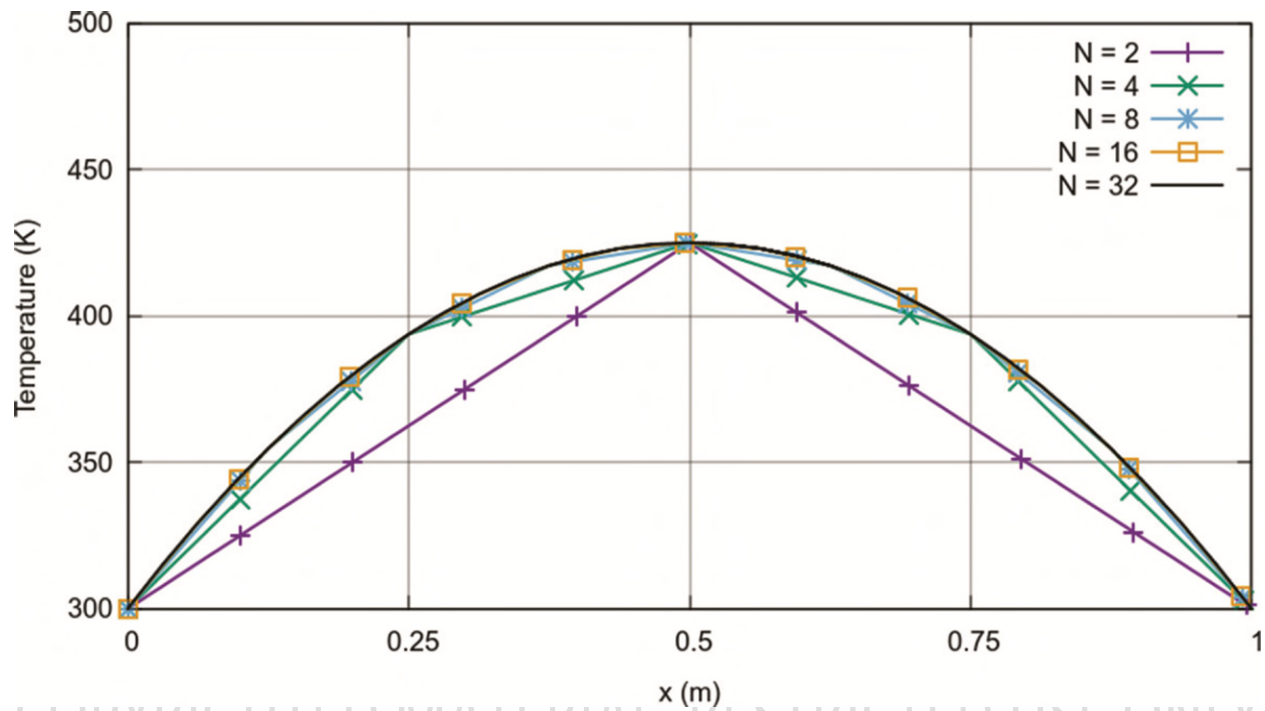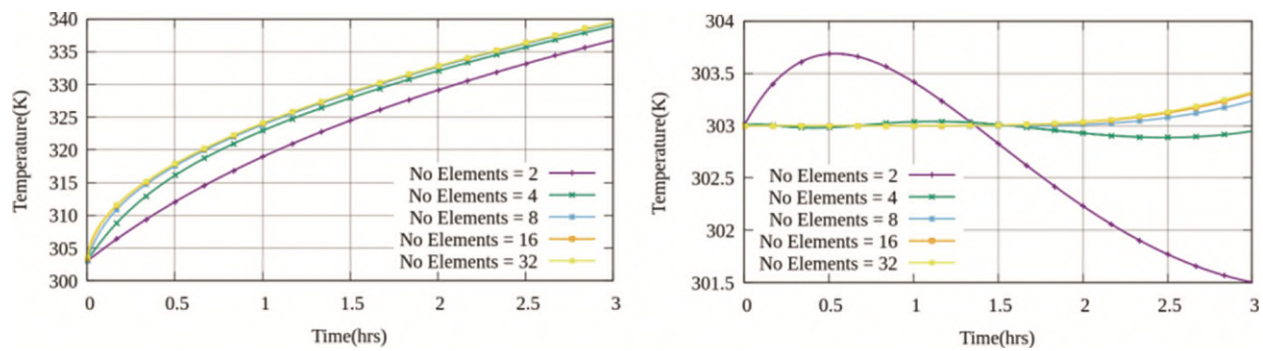
Fig. 7.2 Temperature distribution inside the domain

Fig. 7.5 Temperature history of the inner and outer side of brick wall
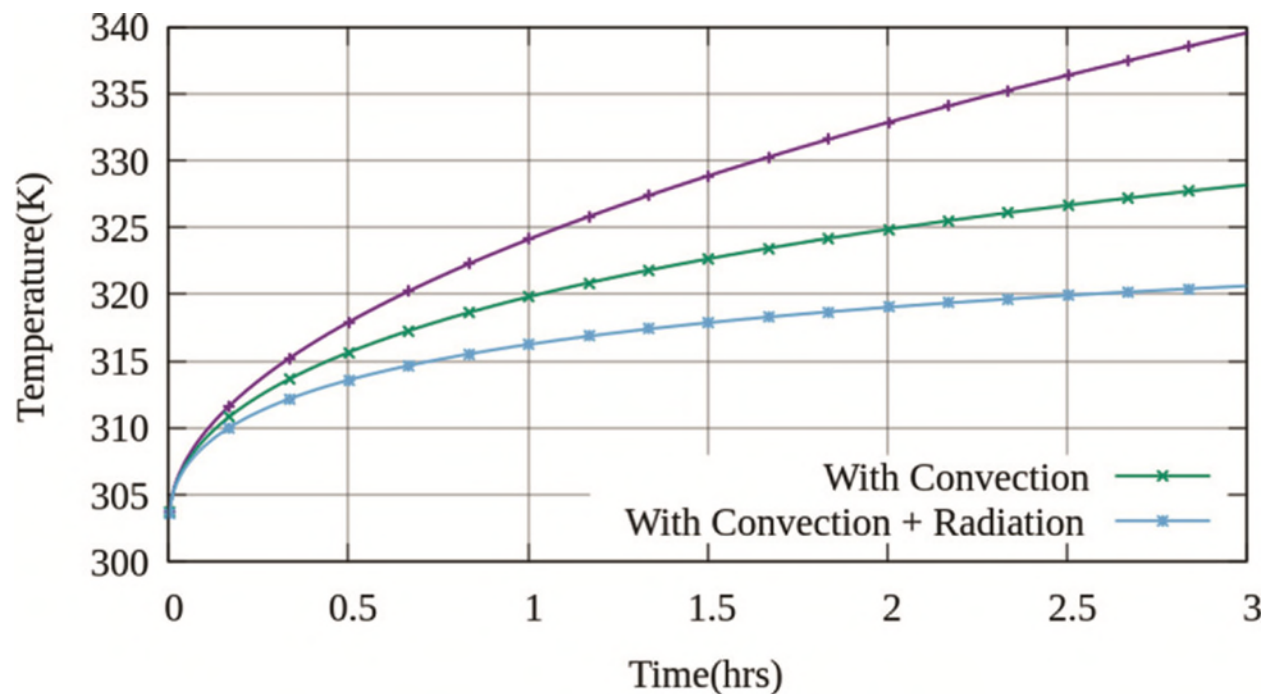
Fig. 7.6 Temperature history of outer wall for three cases

Chapter 10
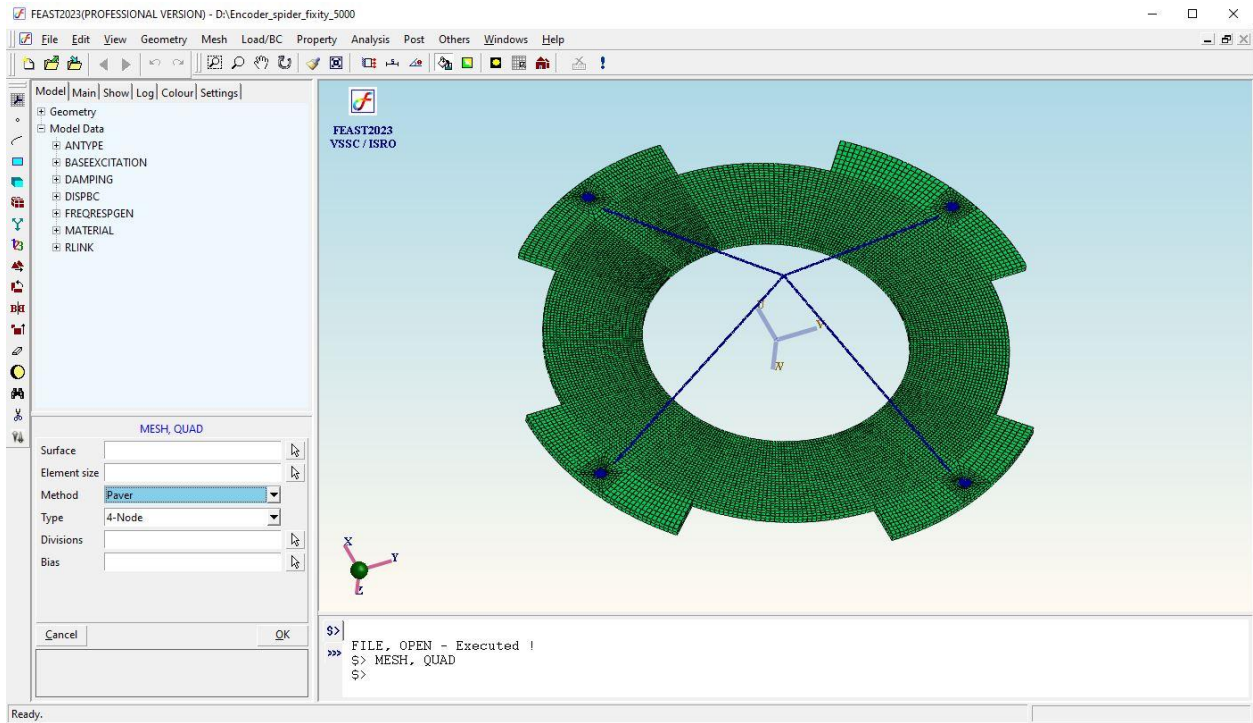
Fig. 10.1 PreWin graphical user interface
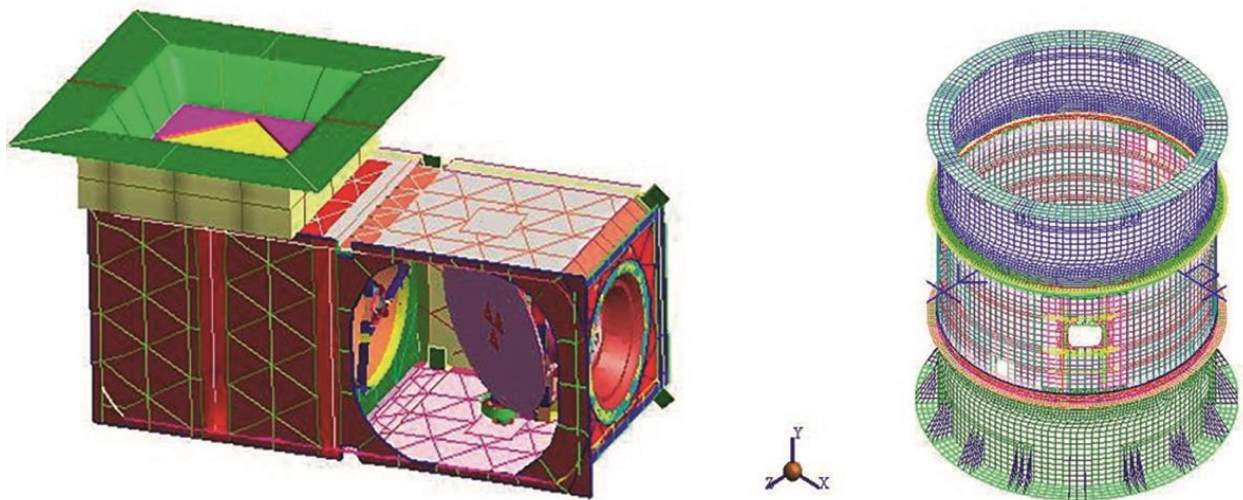
Fig. 10.2 Attribute-based shading
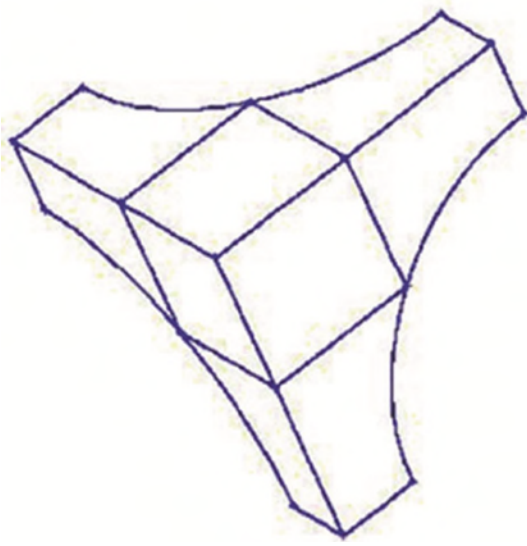
Fig. 10.3 Geometric modelling
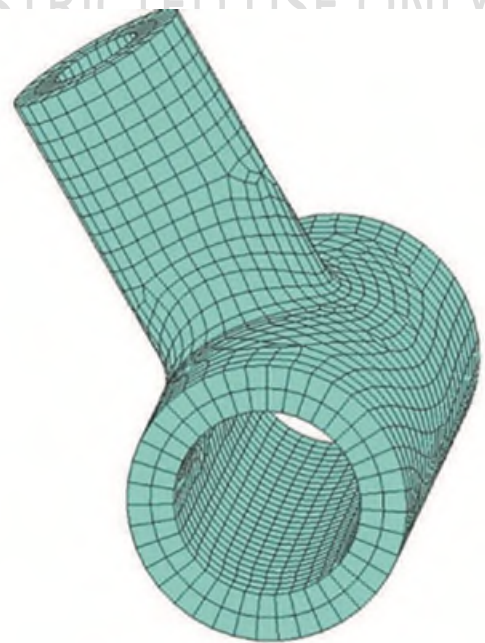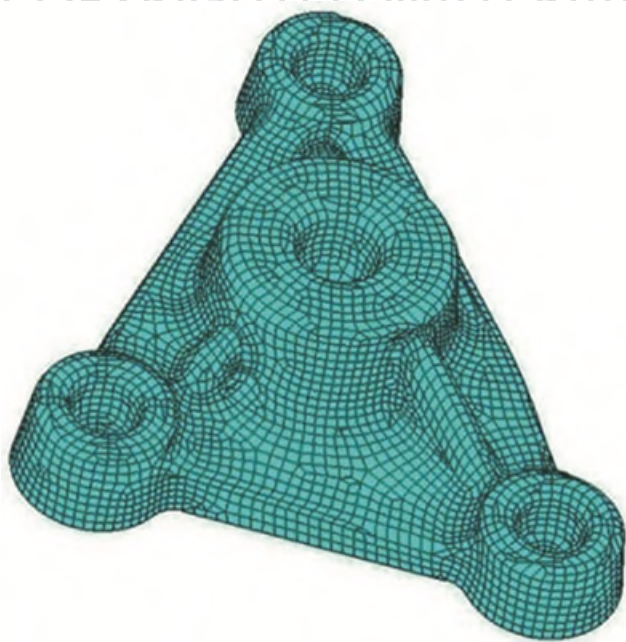
Fig. 10.4 Mesh on surfaces and solids

Translate

Scale

Rotate

Mirror

Sweep **Glide** **Extrude**
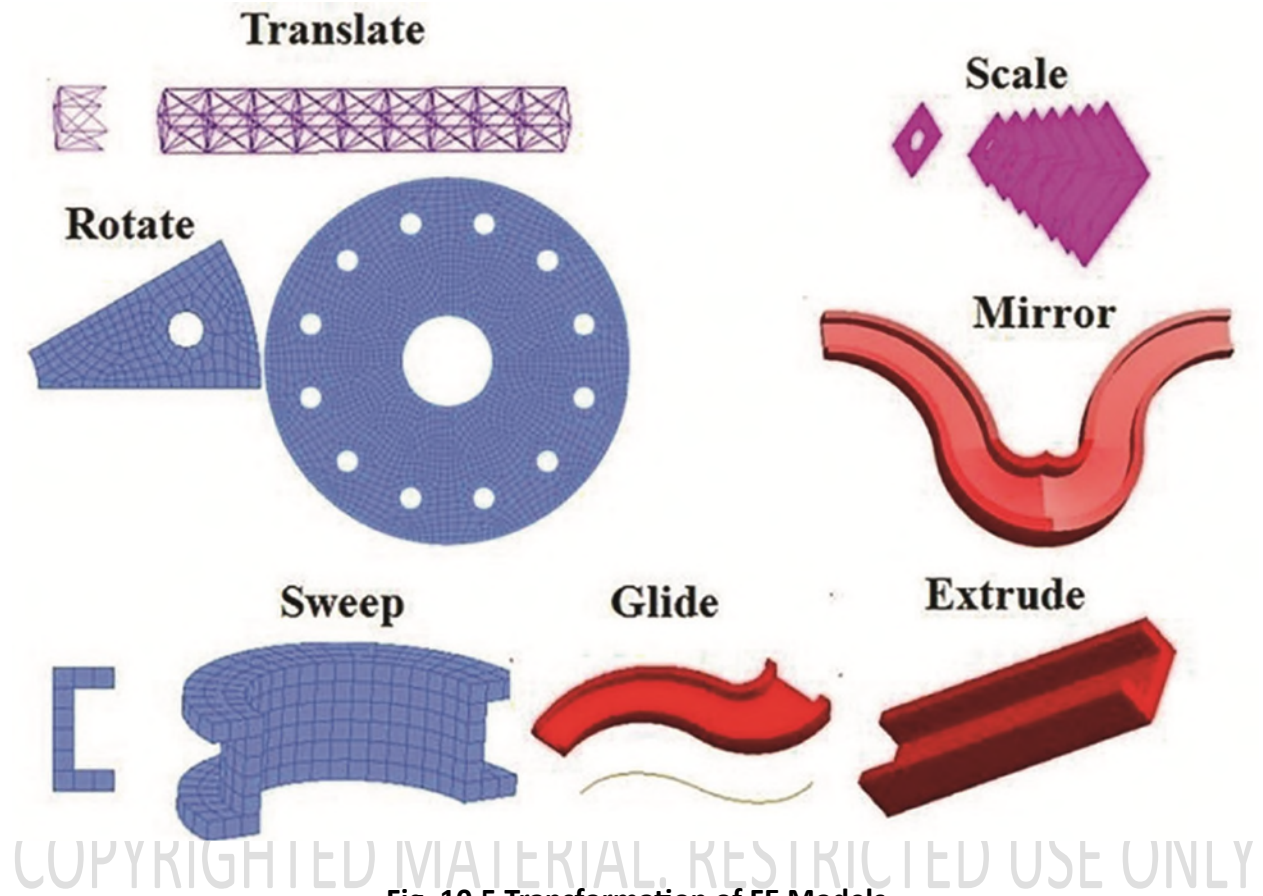
Fig. 10.5 Transformation of FE Models

0.3053
0.2835
0.2617
0.2399
0.2181
0.1963
0.1745
0.1527
0.1308
0.1090
0.0872
0.0654
0.0436
0.0218
0.0000

Fig. 10.6 Post processor graphics

Chapter 11
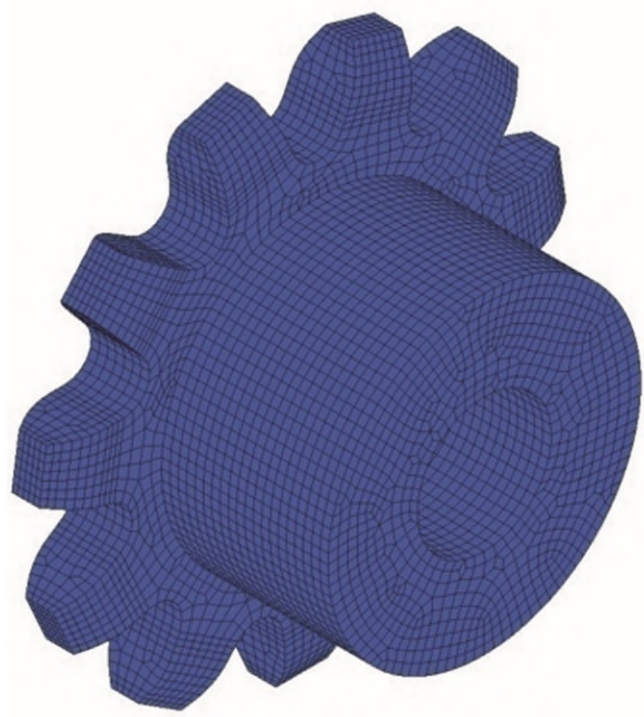
Fig. 11.1 Gear hub meshed with solid elements
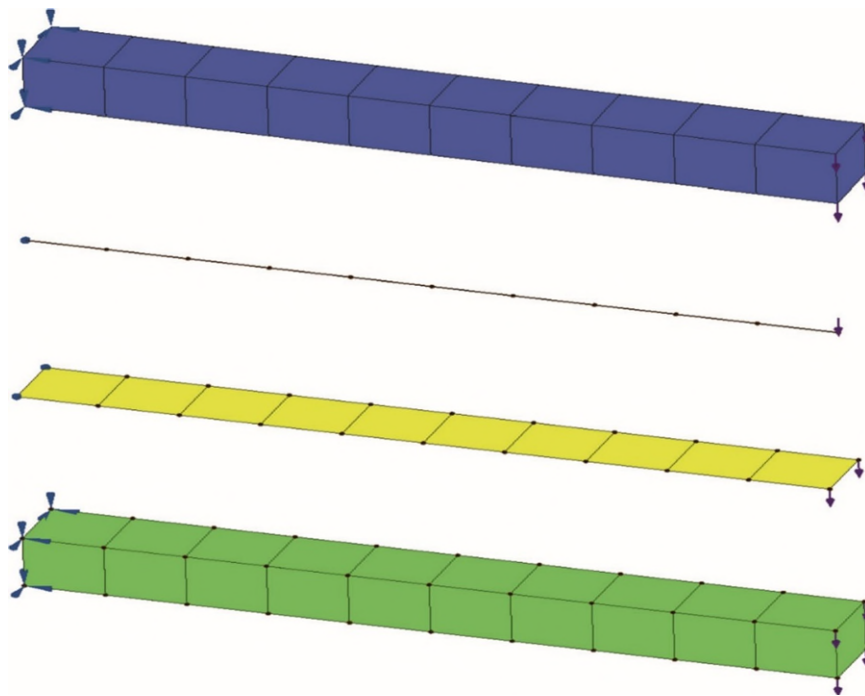
Fig. 11.2 Cantilever beam subjected to end load with different element discretizations
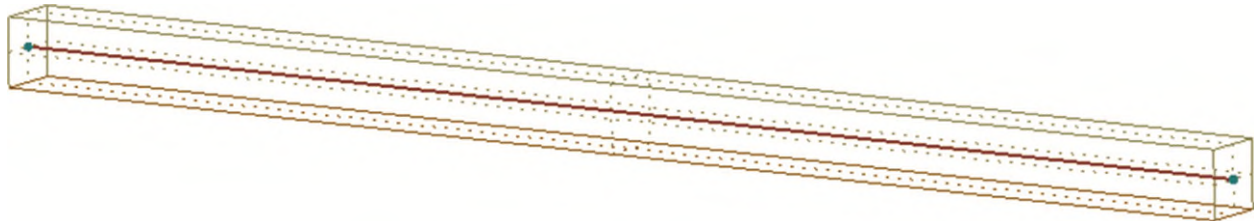
Fig. 11.3 Beam element idealized through the cross-sectional centroid of beam structure
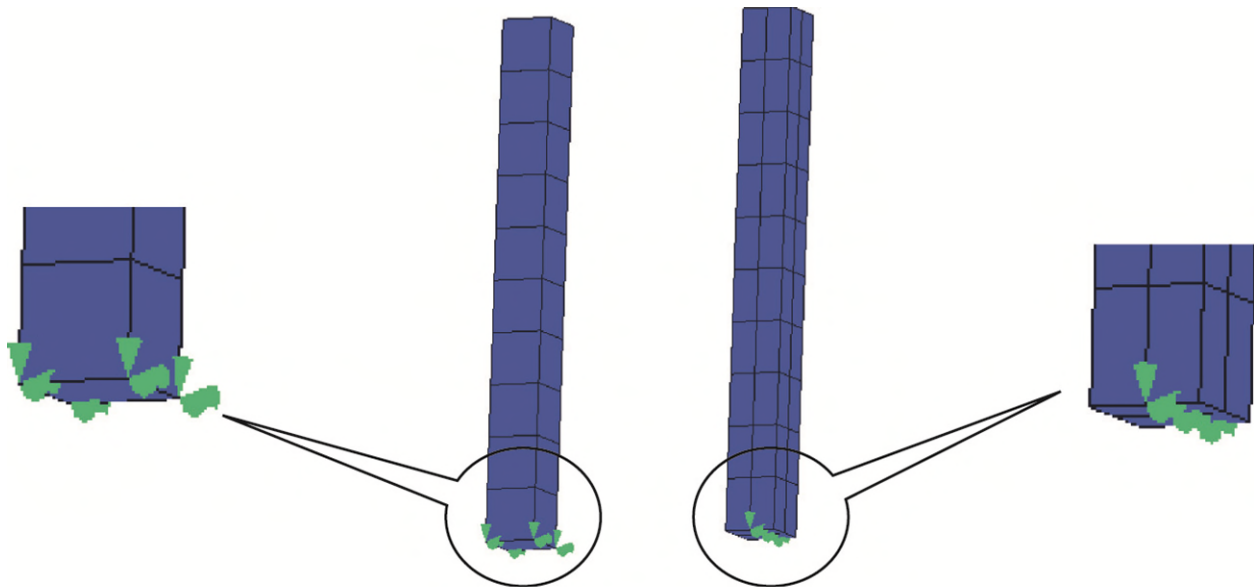
Fig. 11.12 Simply supported boundary condition for model discretized with solid elements
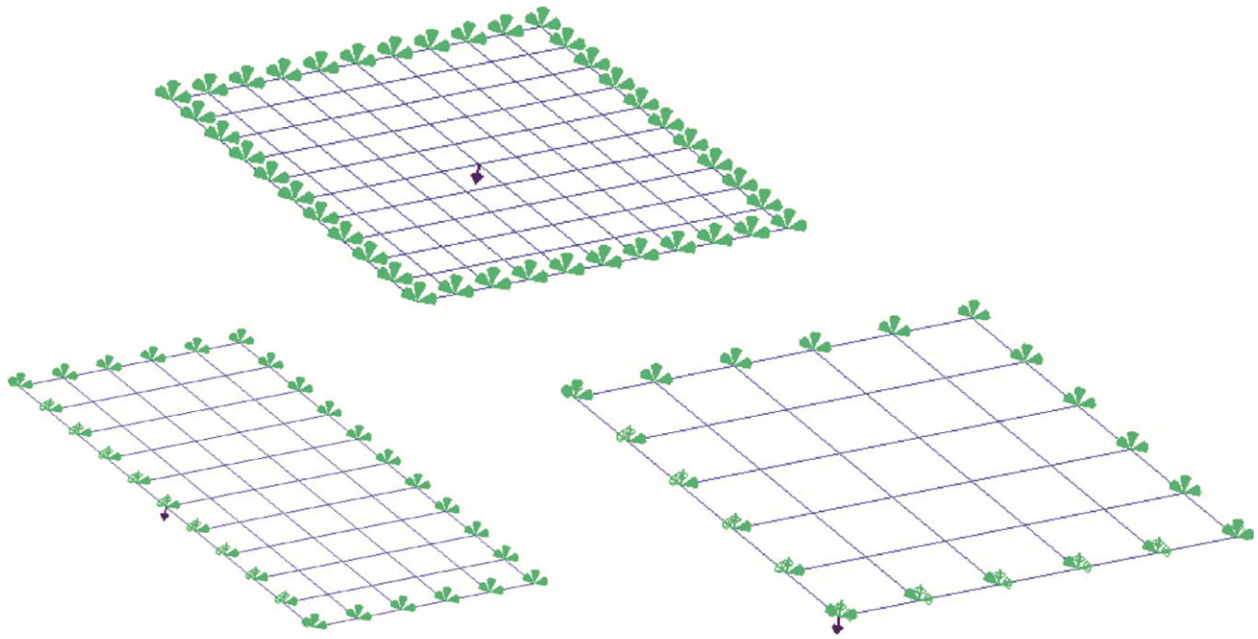
Fig. 11.13 Simply supported plate—full model, half model, quarter model
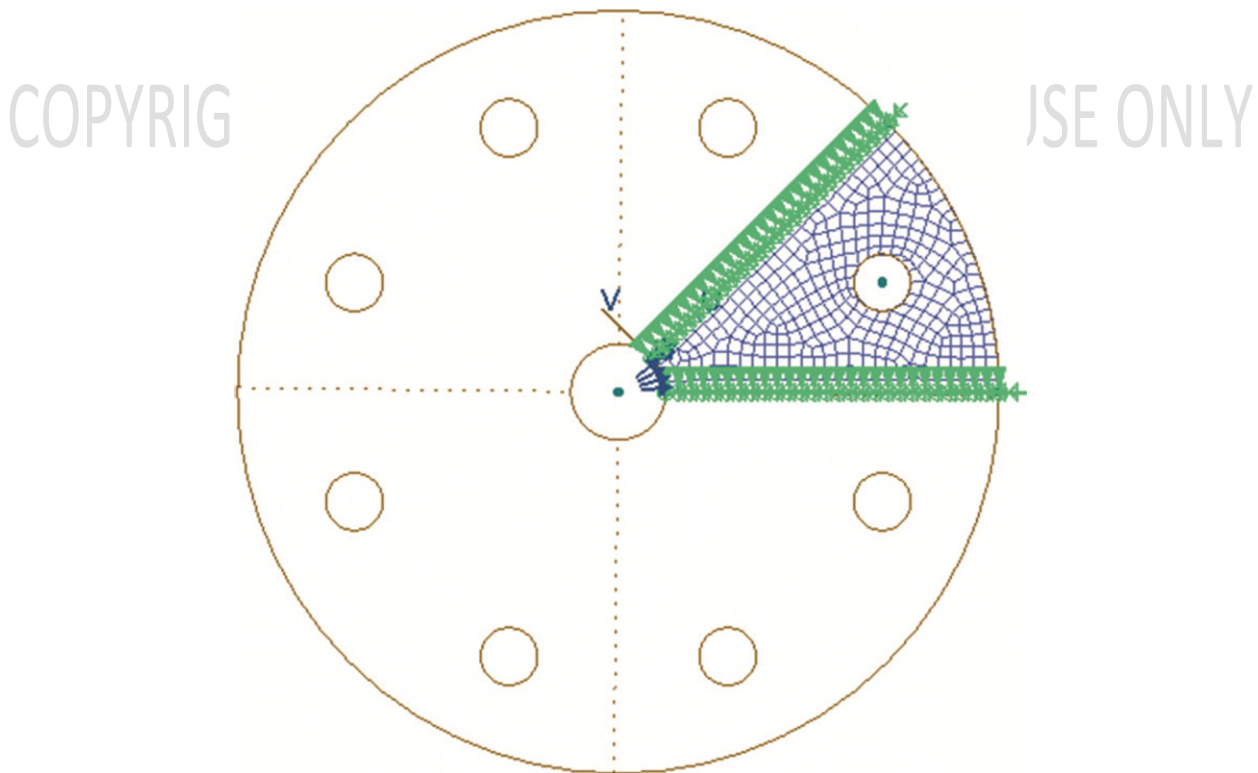
Fig. 11.16 Structure with cyclic symmetry

Fig. 11.17 Structure with repetitive symmetry
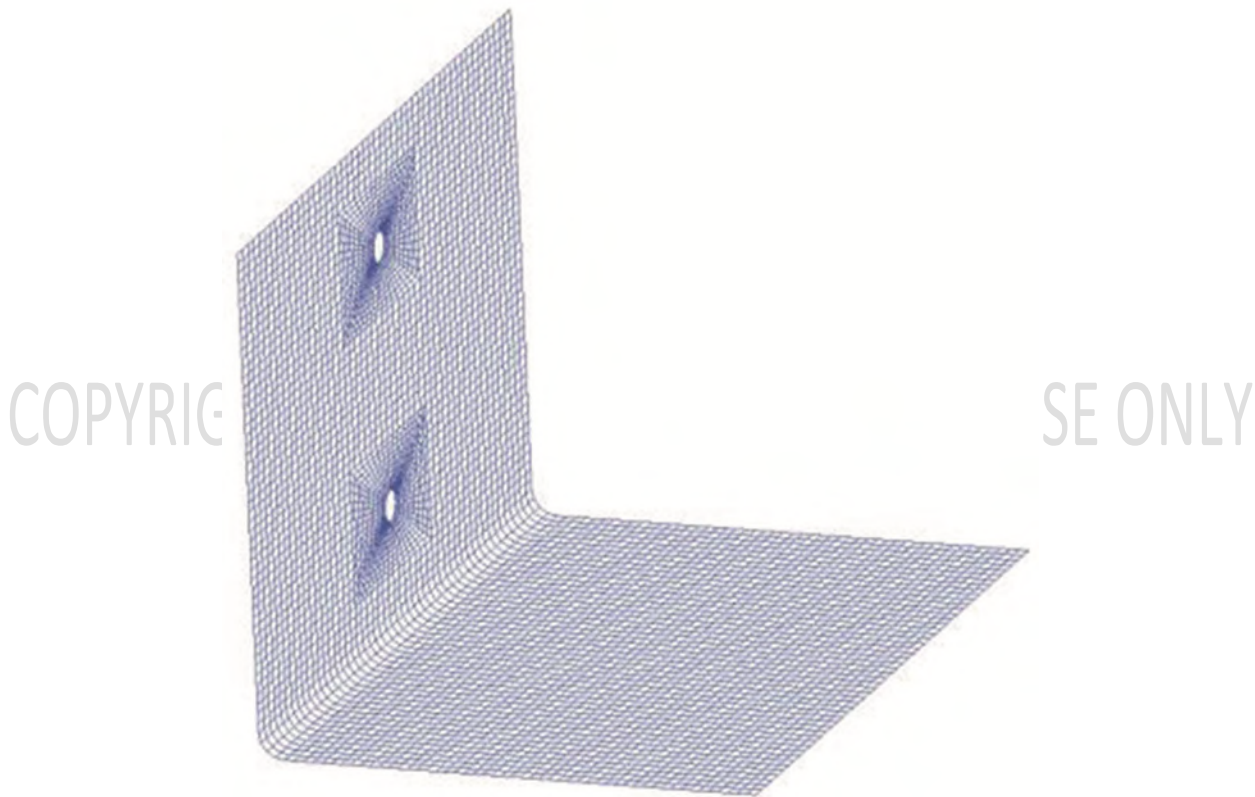
Fig. 11.18 Meshing of a structure with fillets and holes

Chapter 12
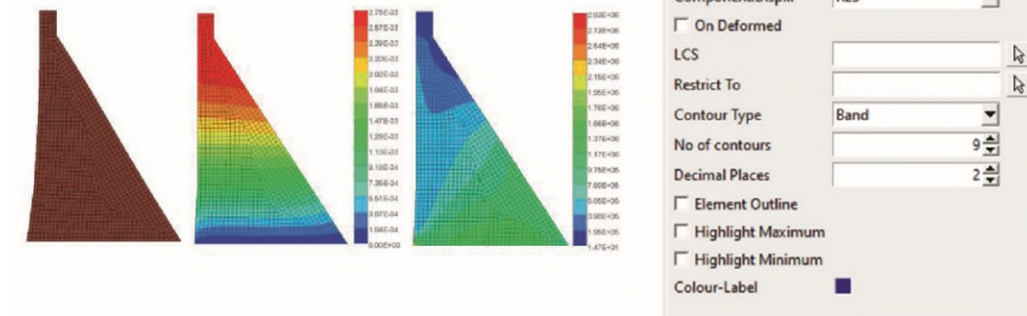
Unnumbered figure from Section: 12.1.3 Post-processing (Displacement/Stress/Strain Contour)
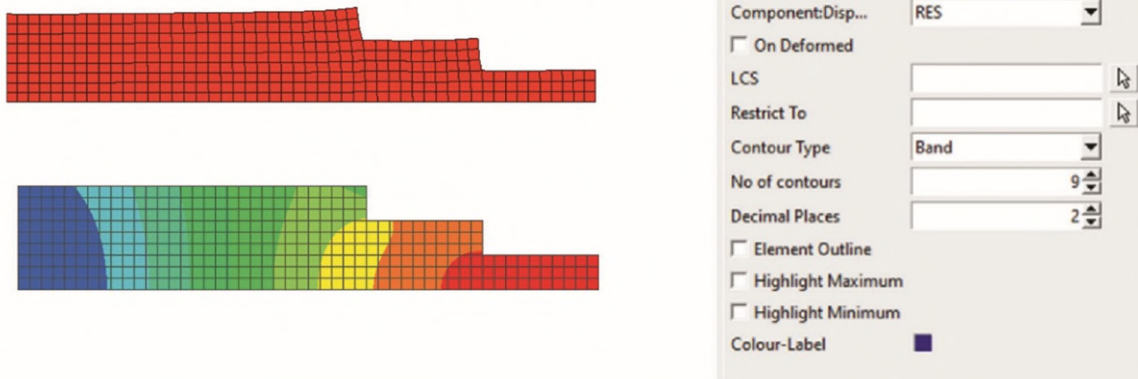
Unnumbered figure from Section 12.4.3 Post-processing (Displacement/Stress/Strain Contour)
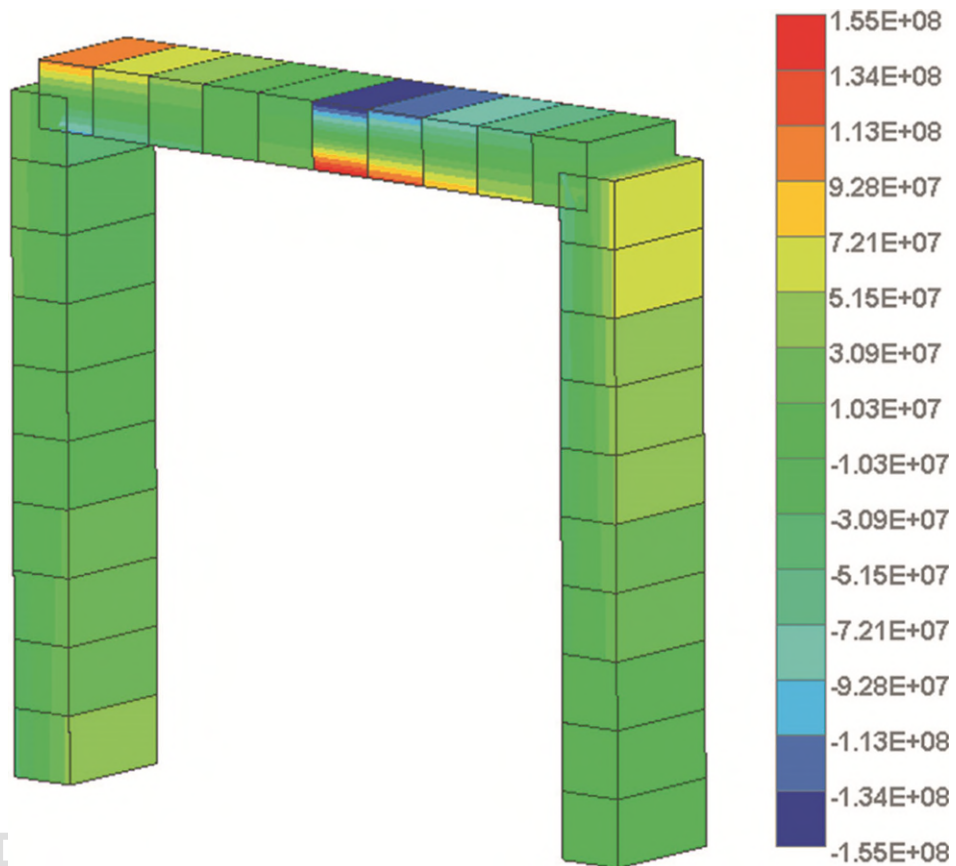
Fig. 12.4 Realistic stress plot
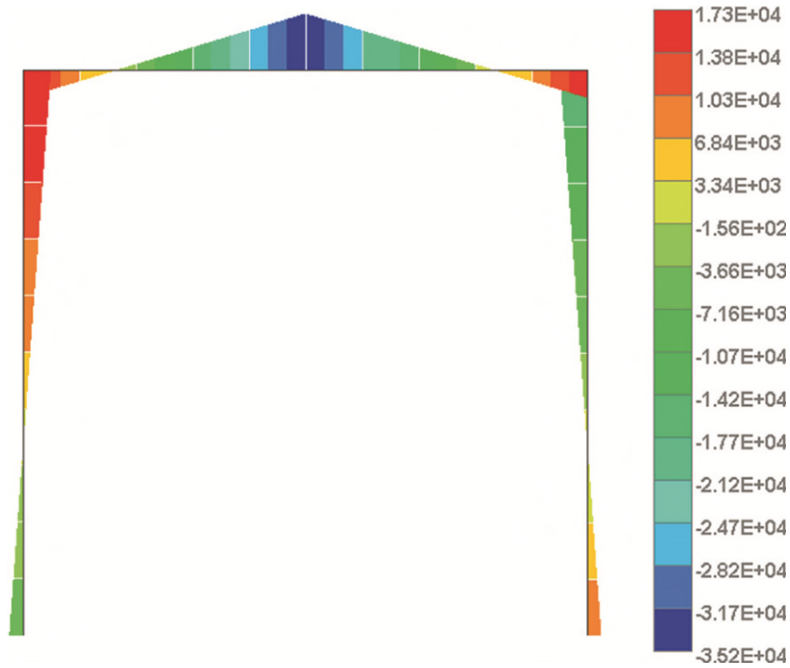
Fig. 12.5 Bending moment diagram

Chapter 13

Command   :   POST, CONTOUR
Menu   :   Post → Contour

3.00E+03	
2.96E+03	
2.93E+03	

Post, Contour

Item	Temperature
Restrict To	ALL[0]
Contour Type	Band
No of contours	9
Decimal Places	2
☐ Element Outline	
☐ Highlight Maximum	
☐ Highlight Minimum	
Colour-Label	■

2.89E+03
2.86E+03
2.82E+03
2.79E+03
2.75E+03
2.71E+03
2.68E+03
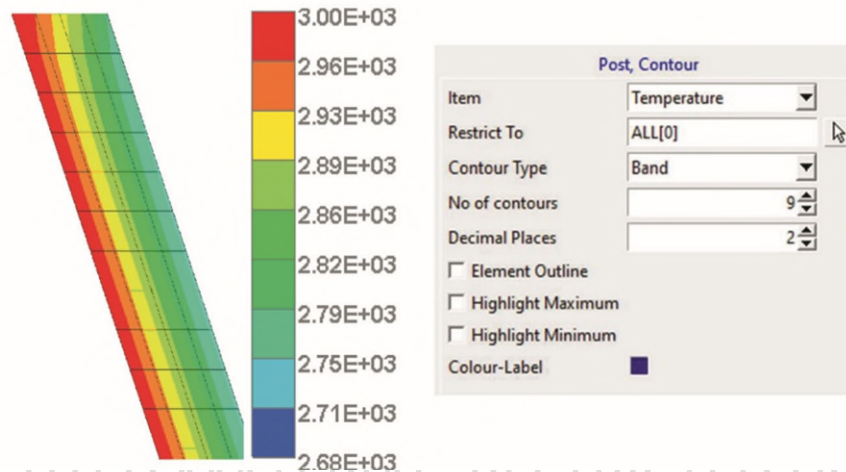
Unnumbered figure from Section: 13.1.3 Post-processing (Temperature Contour)

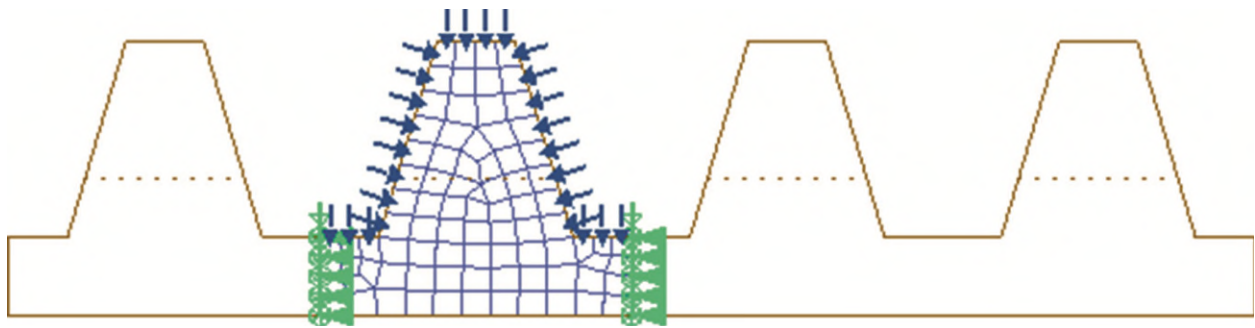Command   :   POST, CONTOUR
Menu   :   Post   Contour

3.03E+02
3.03E+02
3.03E+02
3.03E+02
3.03E+02
3.03E+02
3.03E+02
3.03E+02
3.03E+02
3.03E+02

Post, Contour

Item	Temperature
Restrict To	ALL[0]
Contour Type	Band
No of contours	9
Decimal Places	2
☐ Element Outline	
☐ Highlight Maximum	
☐ Highlight Minimum	
Colour-Label	■
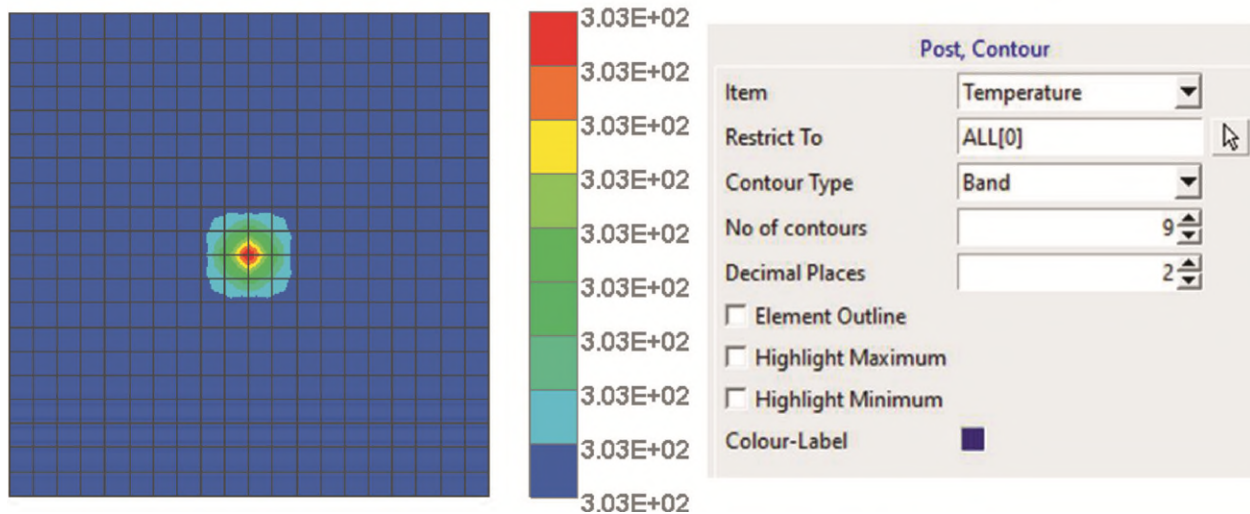
Unnumbered figure from Section: 13.2.3 Processing (Temperature Contour)

Command   :   POST, CONTOUR
Menu   : Post → Contour

1.00E+02	
9.98E+01	
9.95E+01	**Post, Contour**
9.93E+01	Item — Temperature
9.90E+01	Restrict To — ALL[0]
9.88E+01	Contour Type — Band
9.85E+01	No of contours — 9
9.83E+01	Decimal Places — 2
9.80E+01	☐ Element Outline
9.78E+01	☐ Highlight Maximum
9.75E+01	☐ Highlight Minimum
9.73E+01	Colour-Label ▪
9.70E+01	
9.68E+01	
9.65E+01	
9.63E+01	
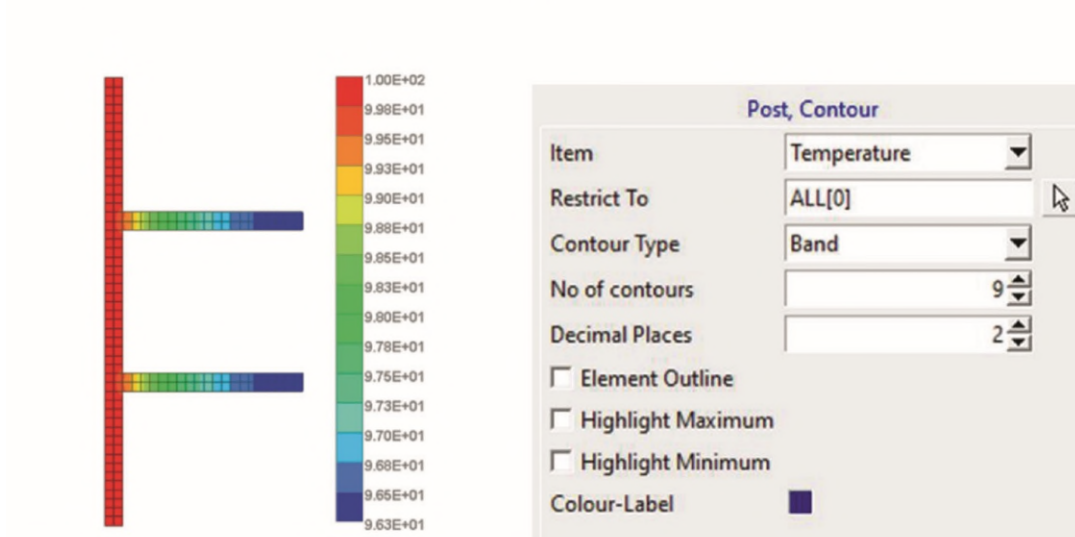
Unnumbered figure from Section: 13.3.3 Post-processing (Temperature Contour)

Chapter 14

2 mm

40 mm

30 mm

1 m

Fig. 14.1 C-section beam

Component	T-RES
Mode	9 - 278.438
Type	Band
Decimal Places	2
LCS	Global Cartesian
No. of contours	9
Scale Factor	1

☑ On Deformed
☐ Animate Deflection
☑ Element Outline
☐ Highlight Maximum
☐ Highlight Minimum
☐ Contour Labels
☐ Use Absolute
☑ Ignore Mid Nodes
Colour:Label
Colour:Element

1.08E+02
1.01E+02
9.42E+01
8.71E+01
8.00E+01
7.29E+01
6.58E+01
5.87E+01
5.16E+01
4.45E+01
3.74E+01
3.03E+01
2.32E+01
1.61E+01
8.98E+00
1.87E+00
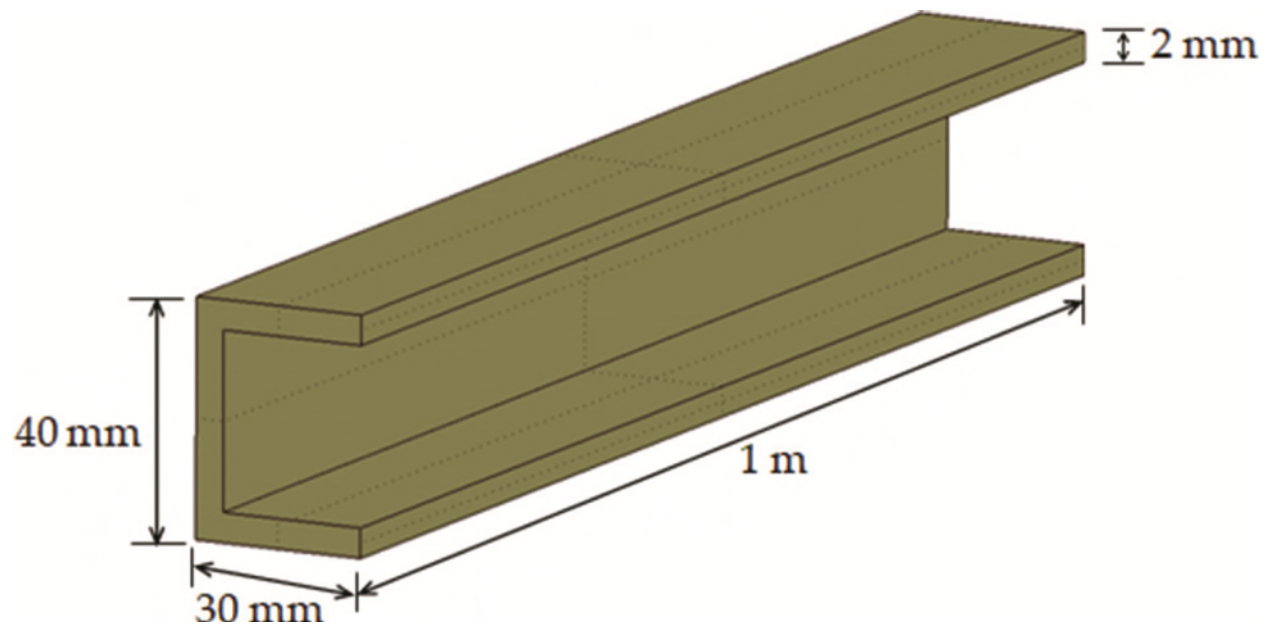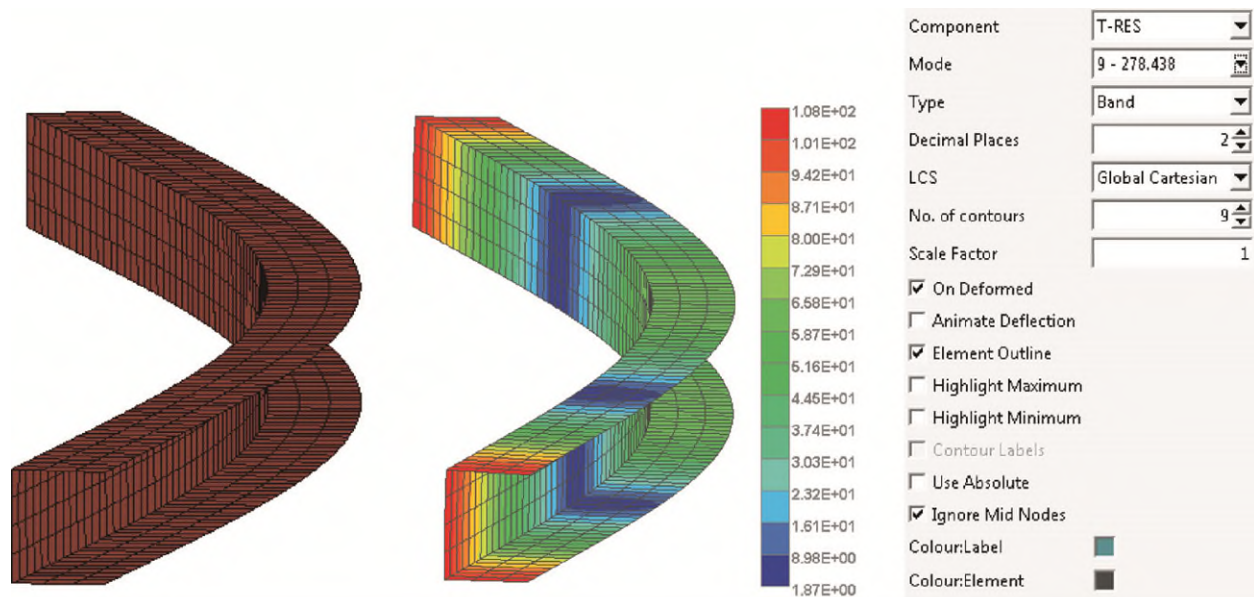
Fig. 14.2 Elastic mode of a C-section beam

200 mm
50 mm
20 mm
R10
50 mm
60 mm
100 mm
100 mm
Ø4
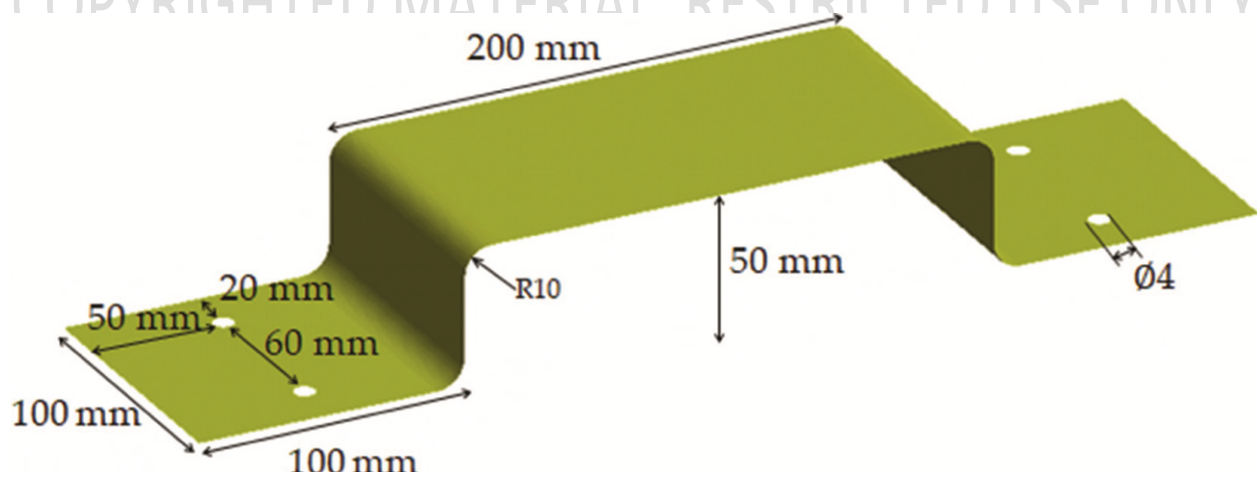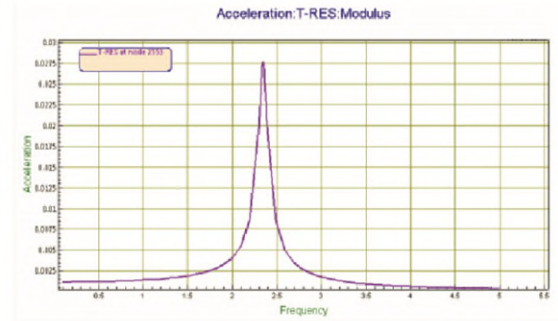
Fig. 14.3 Electronic package mounted on a bracket

Command : POST,HISTORYPLOT
Menu : Post → History Plot
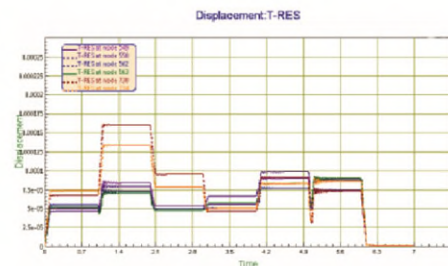
Item	Acceleration
Component	T-RES
Complex As	Modulus

Unnumbered figure from Section: 14.2.3 Post-processing (View History Plot)

Command : POST,HISTORYPLOT
Menu : Post → History Plot

Item	Displacement
Component	RES
Nodes	Use Mouse to pick the Nodes

Unnumbered figure from Section: 14.4.2 Post-processing (View History Plot)
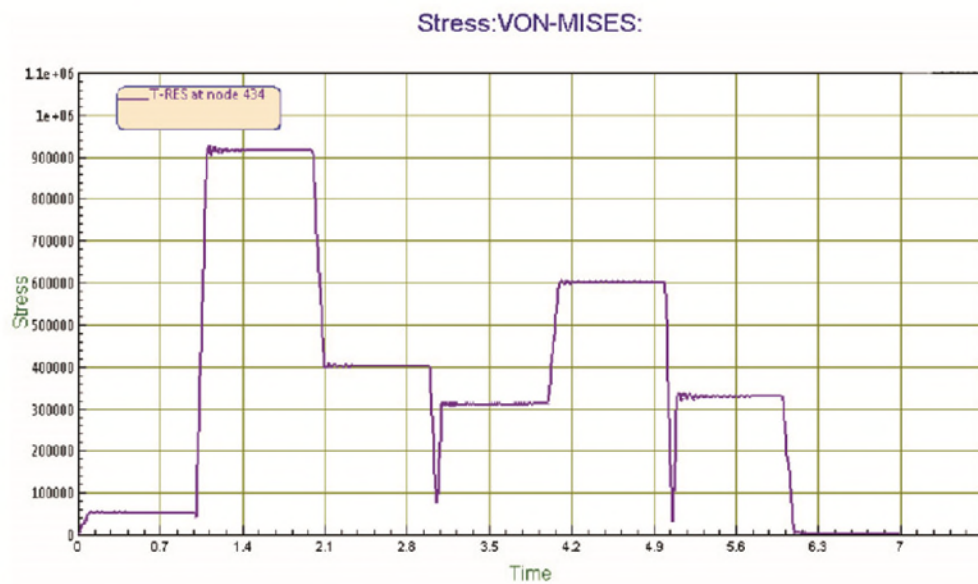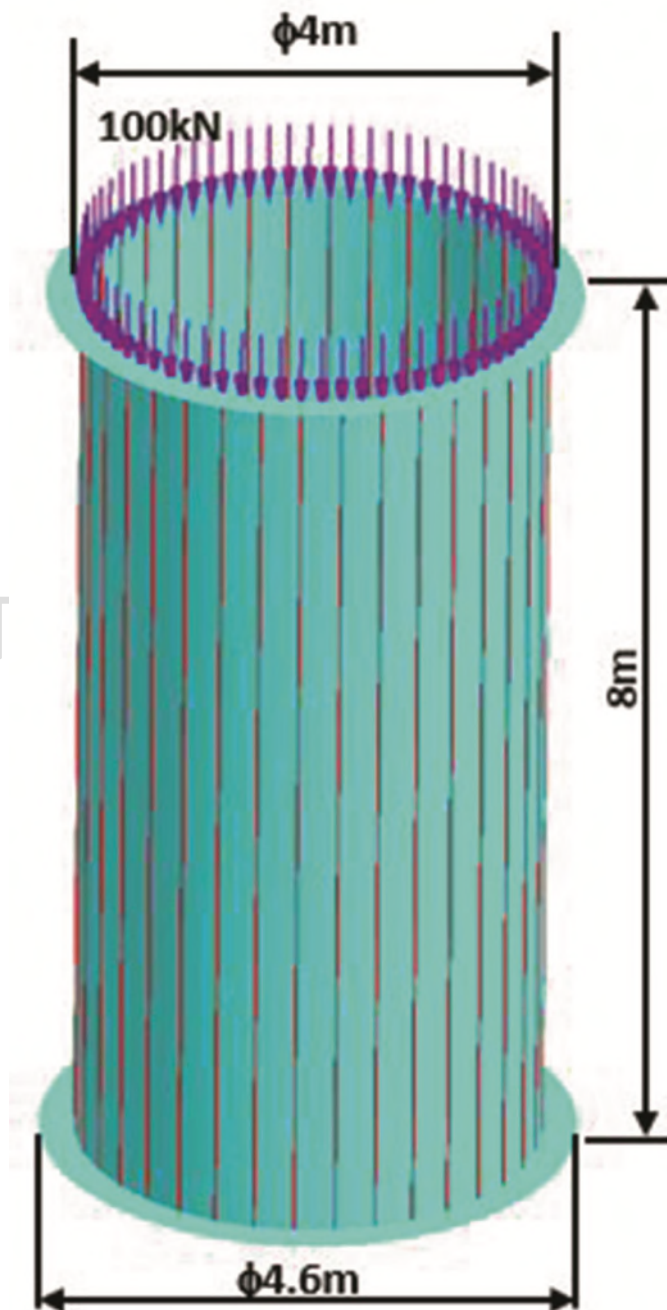
Command : POST,HISTORYPLOT
Menu : Post → History Plot

Item	Stress
Surface	Top
Component	von Mises
Nodes	Use Mouse to pick the Nodes

Stress:VON-MISES:

Unnumbered figure from Section: 14.4.2 Post-processing (View Stress Plot)

φ4m

100kN

8m

φ4.6m

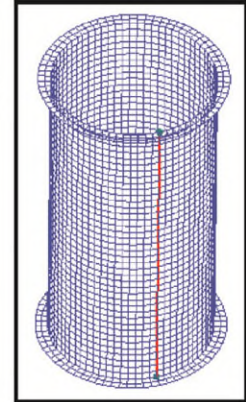**15.1 Cylinder with compressive loading**

Commands : EDGEMESH, STIFFENER
Menu : Mesh → FE Mesh → Using Edges → Stiffener
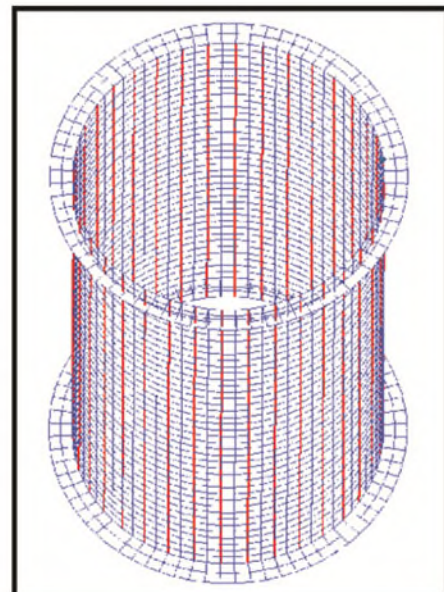Parameters : (To be filled by the user)

Element edges	Use mouse to select the Element edges
Material ID	1
Property ID	1

Unnumbered figure from Section: 15.2 Pre-processor (Create Stiffeners)

Commands : ELEMENT, ROTATE
Menu : Mesh → Element → Transform → Rotate
Parameters : (To be filled by the user)

List of Elements	Use mouse to select the elements
Angle	10
Axis	Y Axis
Location	0:0:0
Copies	35

Unnumbered figure from Section: 15.2 Pre-processor (Create more stiffeners using Rotate element option)

Commands : POINTLOAD,ADD
Menu : Load/BC → Structural → Point Load
Parameters : (To be filled by the user)

Nodes	Cylinder top nodes (1/4/84T2913B41)
Magnitude	-100
Component	Fy
LCS	1
Label	
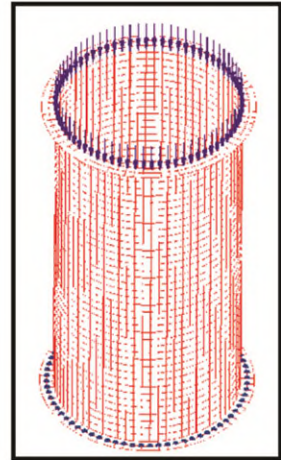
Unnumbered figure from Section: 15.4 Result Viewing Using Post-processing (Mode Shape Contour)