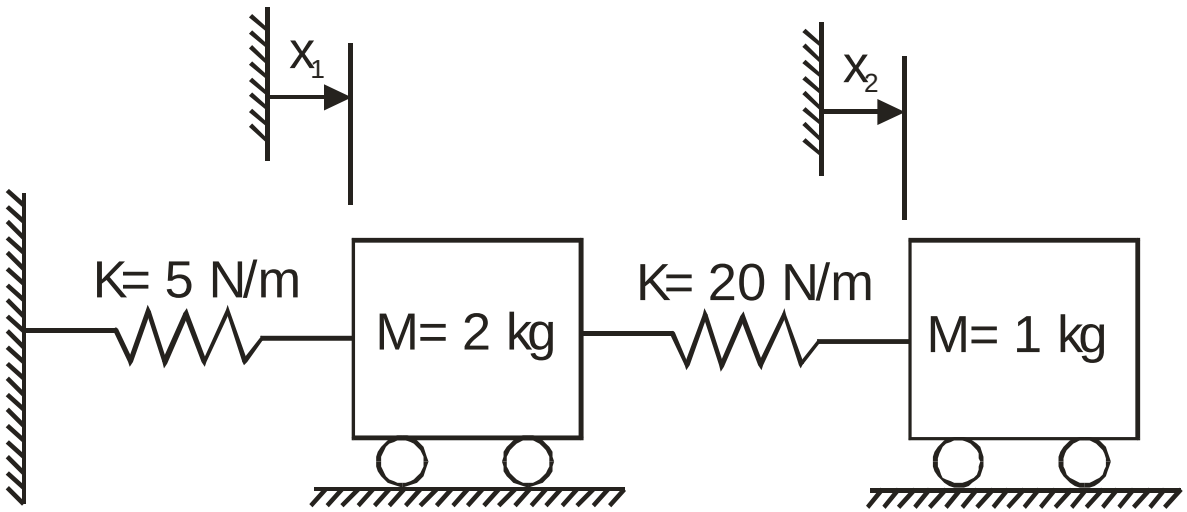
Course in ANSYS

Example0430

Example – Spring mass system



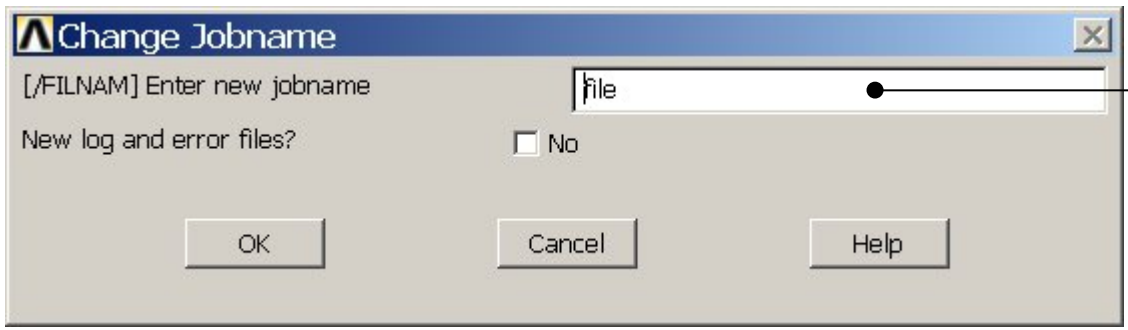
Objective:
Compute the eigen frequency modes of the system
Tasks:
Display the eigen modes of the system?
Topics:
Topics: Start of analysis, Element type, Real constants, Material, modeling, element size for beam models, modal analysis, saving/restoring

$E = 1 N/m^2$
$\nu = 0$
F = none applied for modal analysis
$x_1 = 5$
$x_2 = 11$

Example - title

Utility Menu > File > Change Jobname — GUI

/jobname, Example0430 — Command line entry

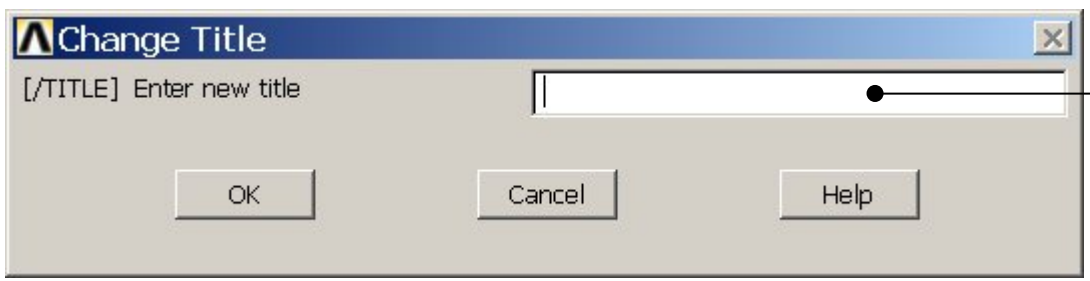


Enter: Example0430

Utility Menu > File > Change Title

/title, Spring mass system

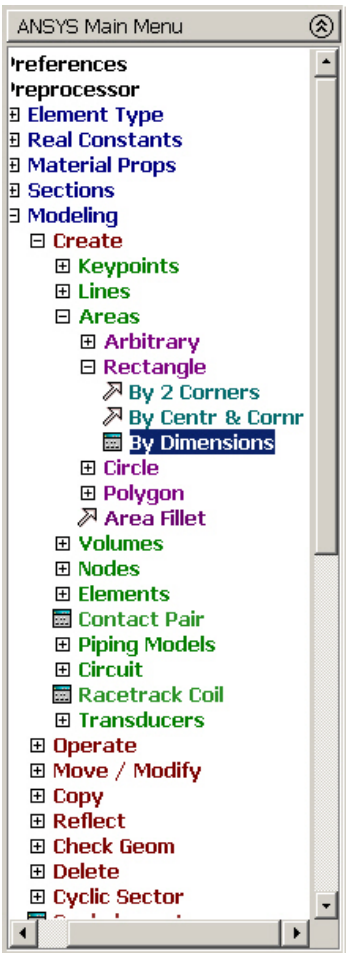
Enter: Spring mass system

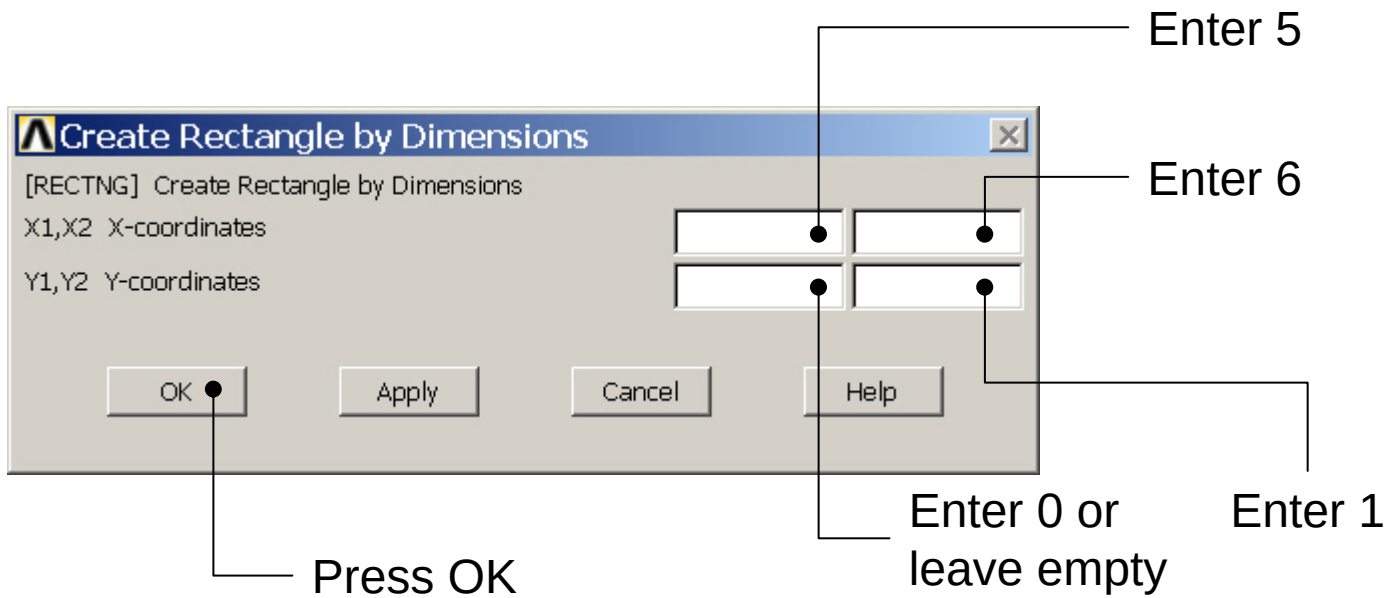


Example – Areas Rectangle

Preprocessor > Modeling > Create > Areas > Rectangle > By Dimensions

Create an area given by X=(0,100) and Y=(0,50)





Note: Keypoints (4 kp's) and lines (4 lines) are automatically generated (also numbered automatically)

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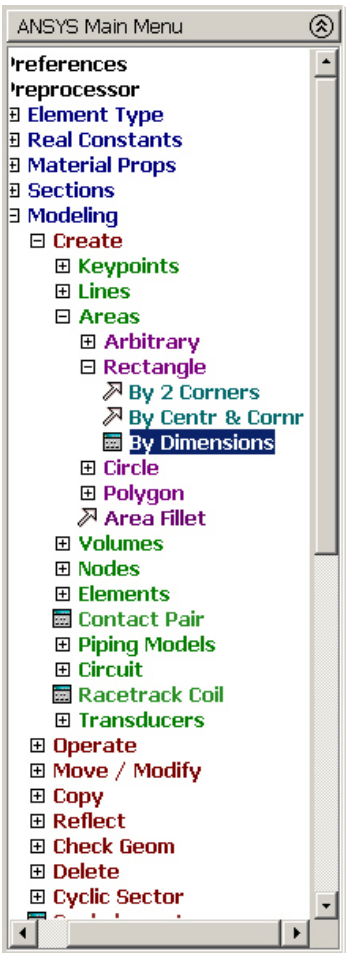
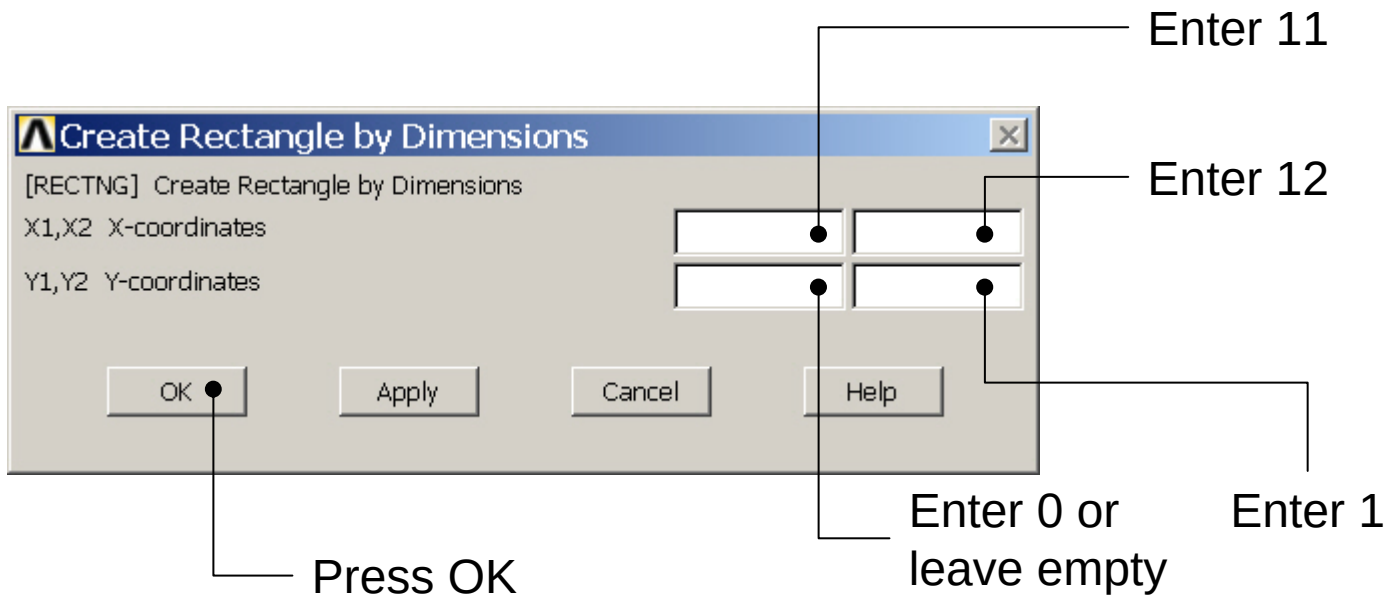
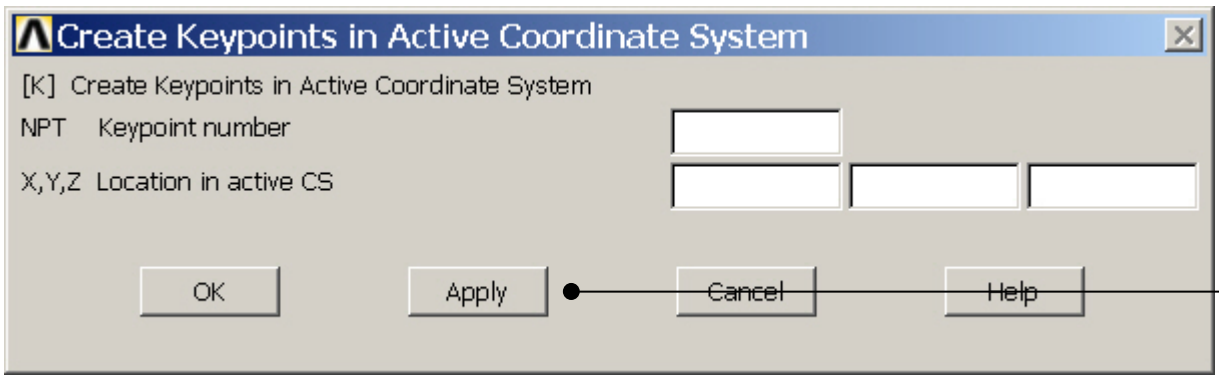




Note: Keypoints (4 kp's) and lines (4 lines) are automatically generated (also numbered automatically)

Example - Keypoints

Preprocessor > Modeling > Create > Keypoints > In Active CS



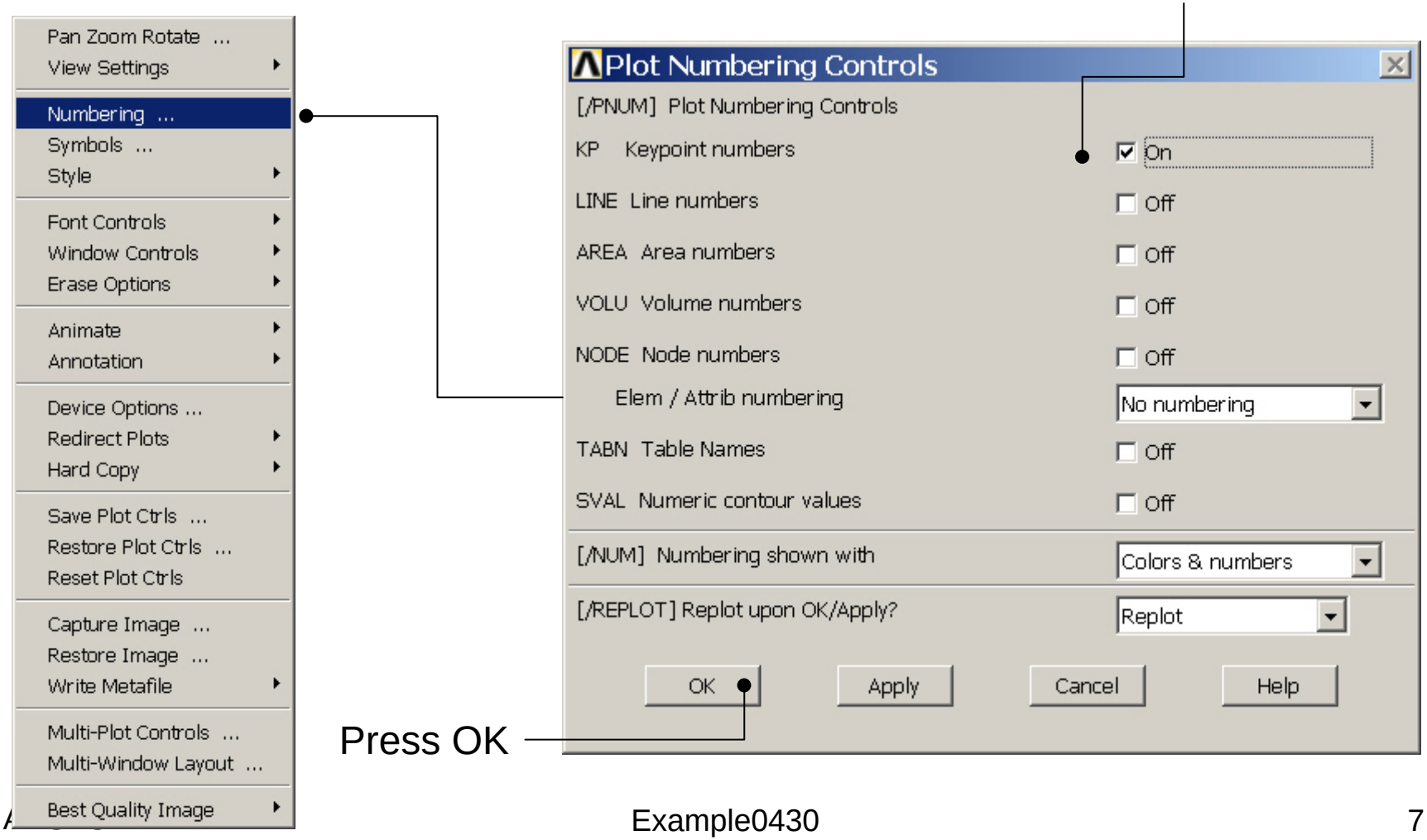
Enter 0,0.5,0 and Press **Apply**

Note: An empty box result in a zero. It is allowed to enter 0.0 in each box.

Example - Numbering

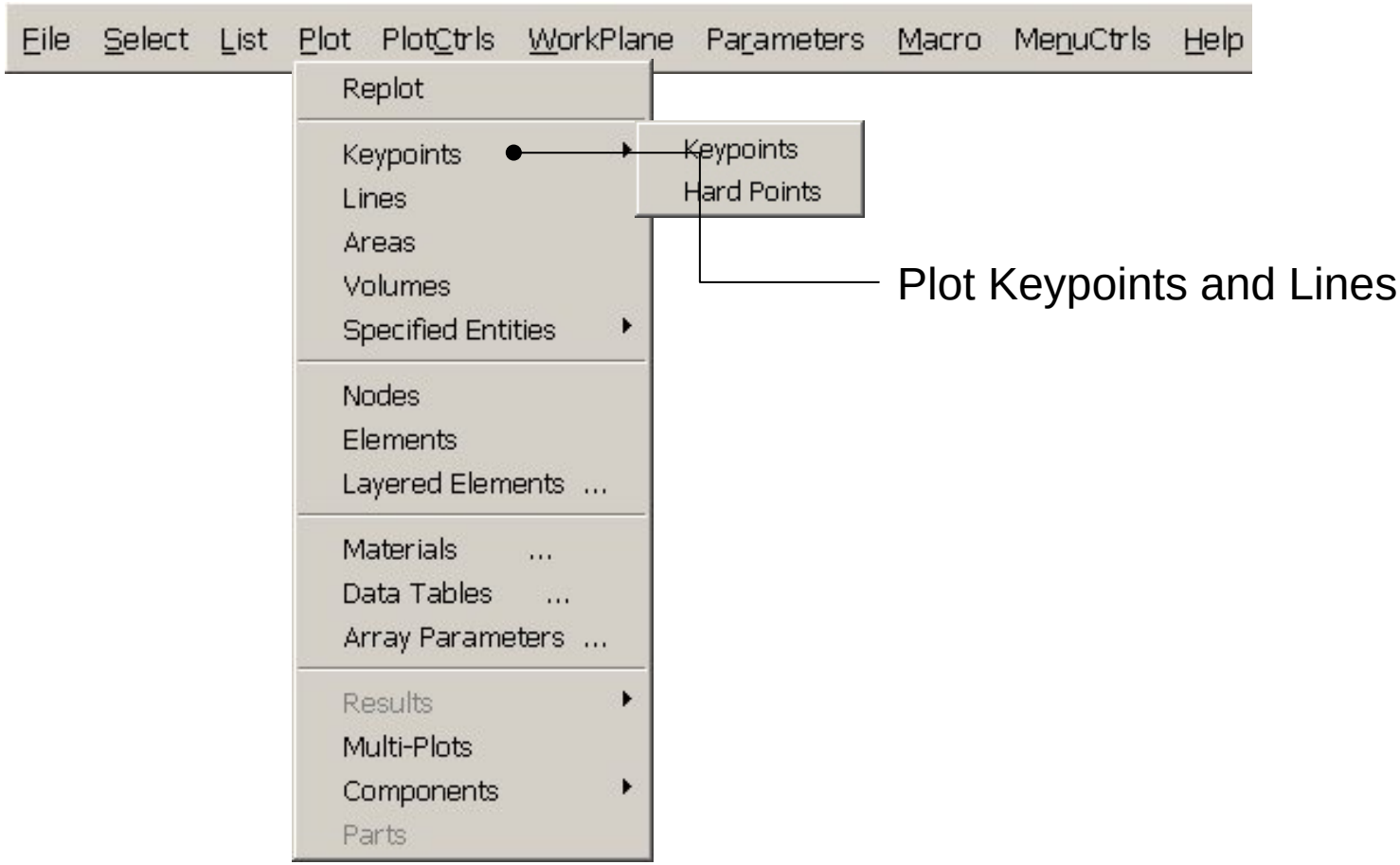
Utility Menu > PlotCtrls > Numbering

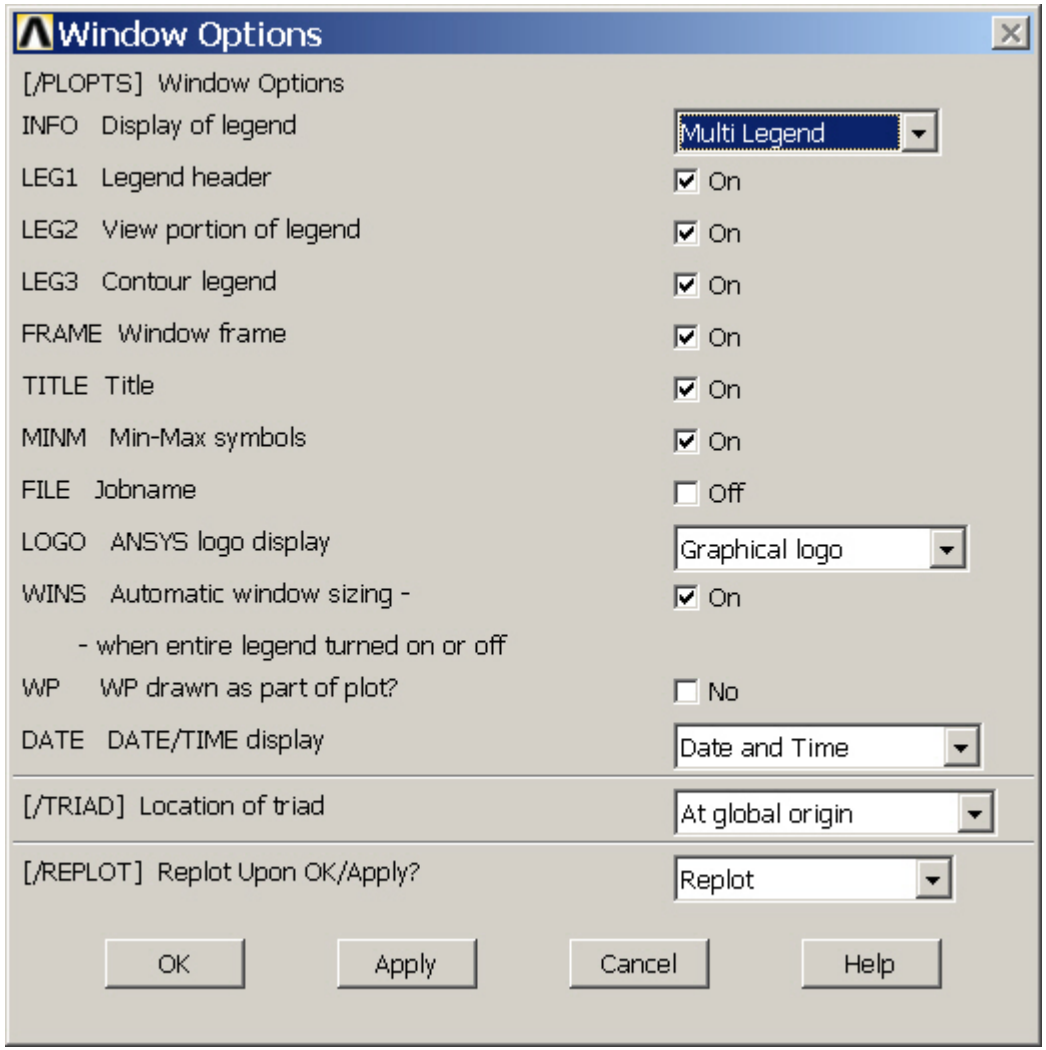
Switch on Keypoint numbers



Press OK

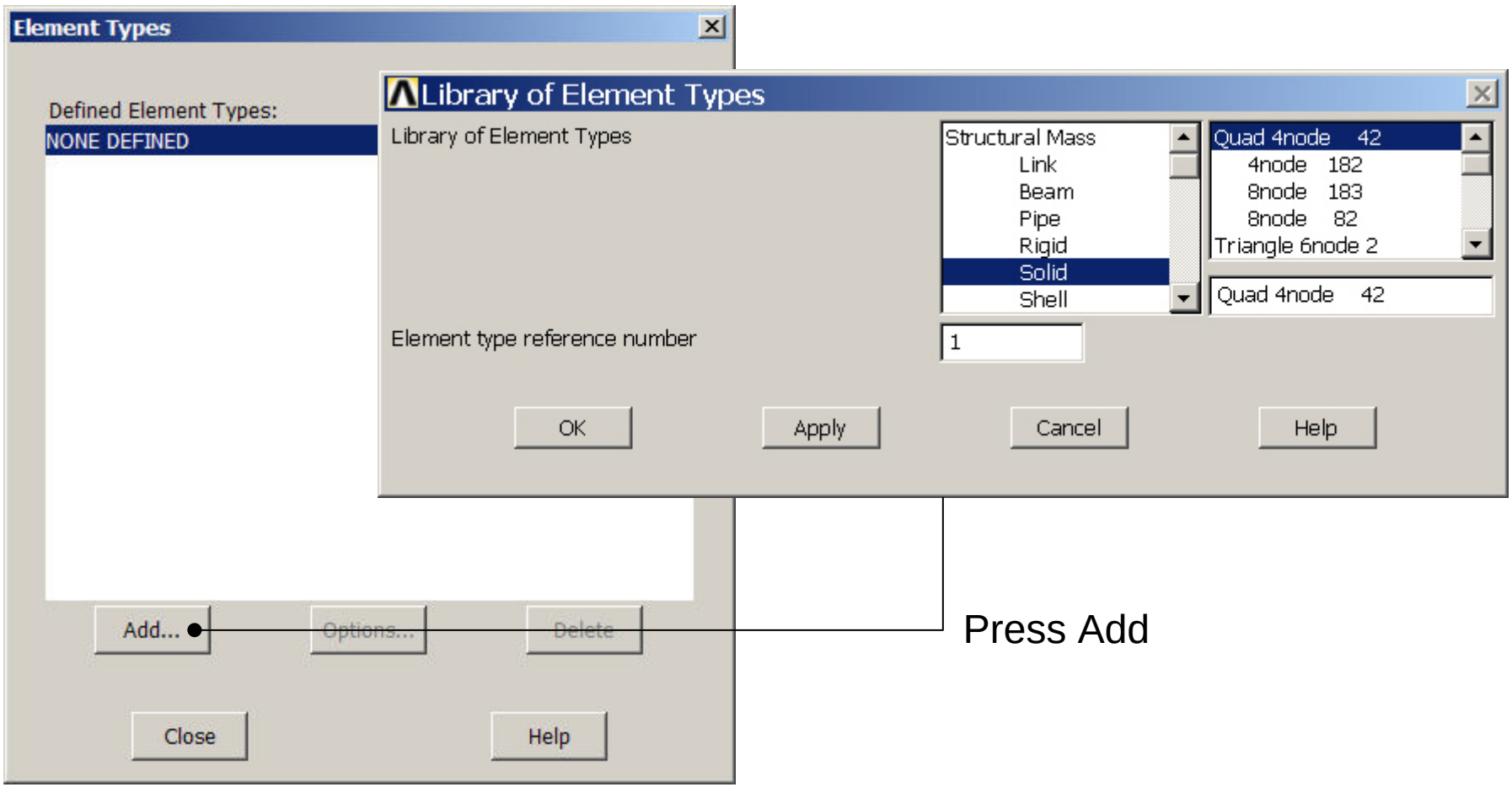
Example - Plot




Window Options
[/PLOPTS] Window Options
INFO Display of legend
Multi Legend
LEG1 Legend header
On
LEG2 View portion of legend
On
LEG3 Contour legend
On
FRAME Window frame
On
TITLE Title
On
MINM Min-Max symbols
On
FILE Jobname
Off
LOGO ANSYS logo display
Graphical logo
WINS Automatic window sizing -
On
- when entire legend turned on or off
WP WP drawn as part of plot?
No
DATE DATE/TIME display
Date and Time
[/TRIAD] Location of triad
At global origin
[/REPLOT] Replot Upon OK/Apply?
Replot
OK
Apply
Cancel
Help

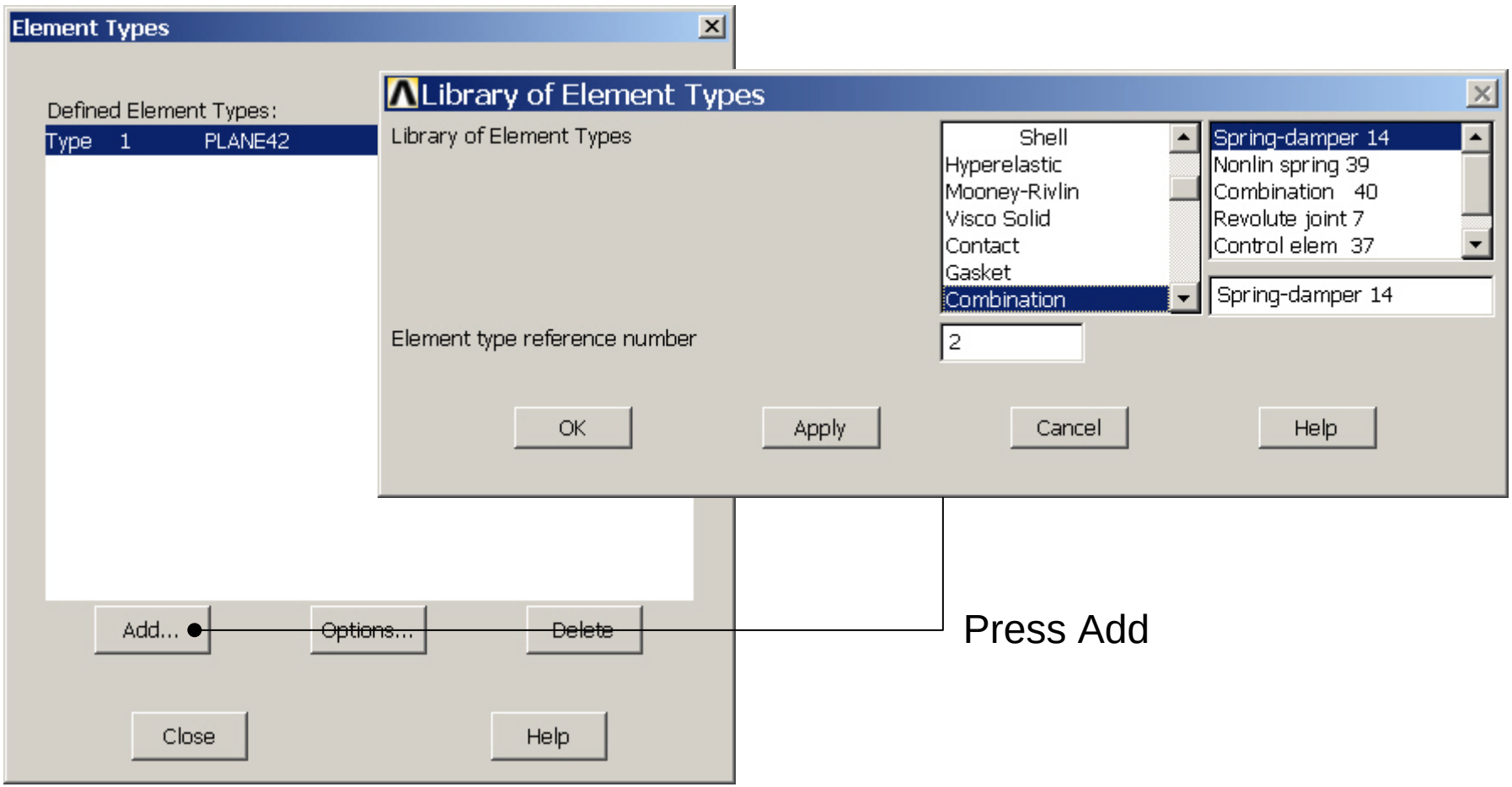
Example – Element Type

Preprocessor > Element Type > Add/Edit/Delete



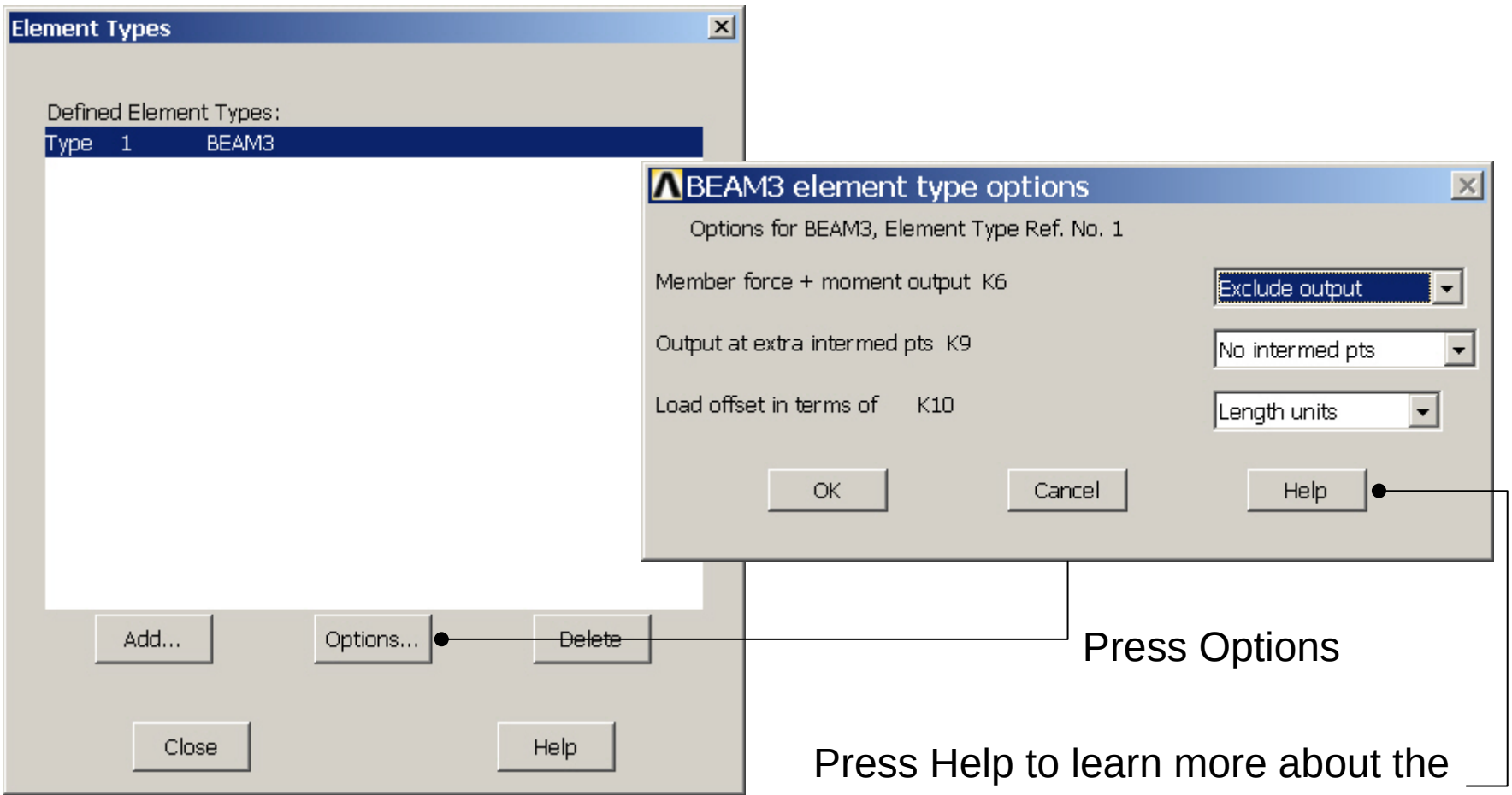
Example – Element Type

Preprocessor > Element Type > Add/Edit/Delete



Example - Element Type

Preprocessor > Element Type > Add/Edit/Delete

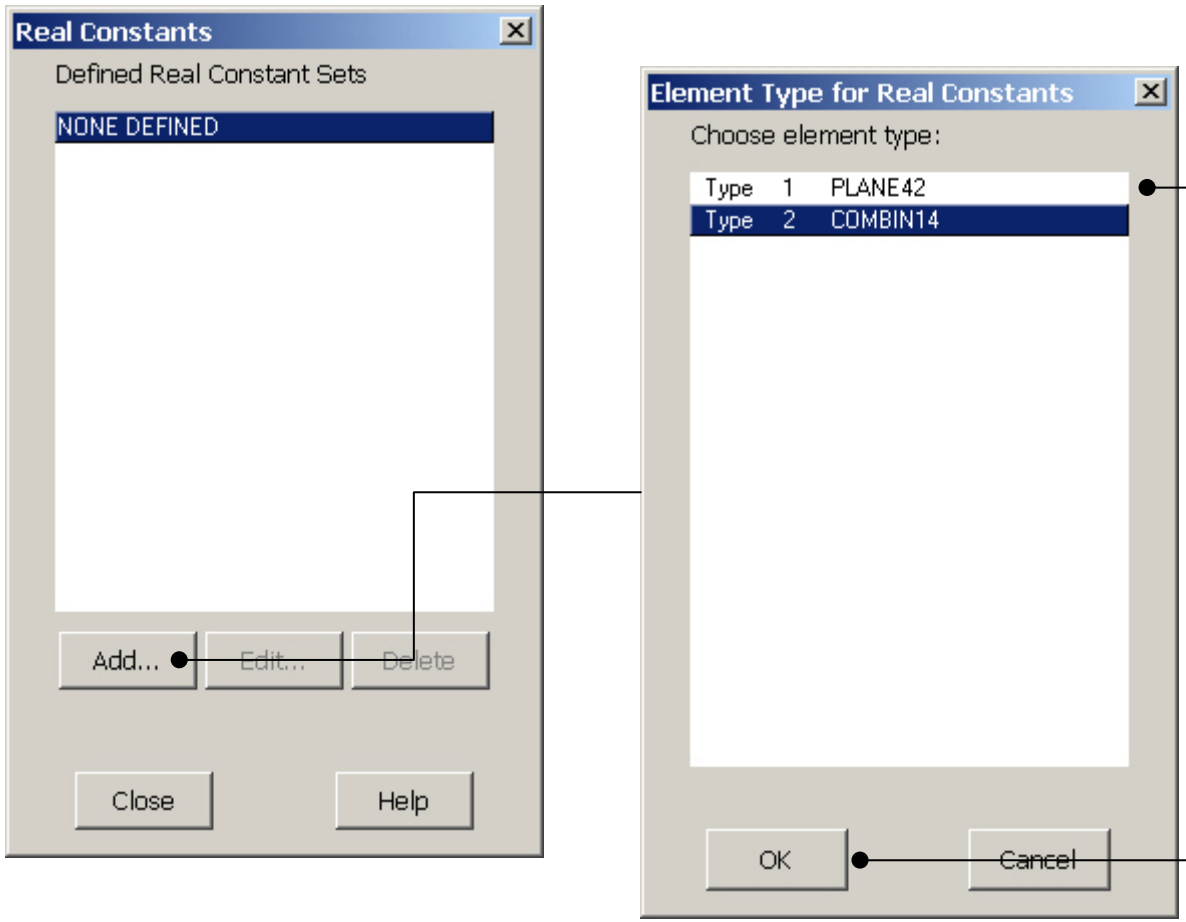


Press Options

Press Help to learn more about the element.

Example – Real Constants

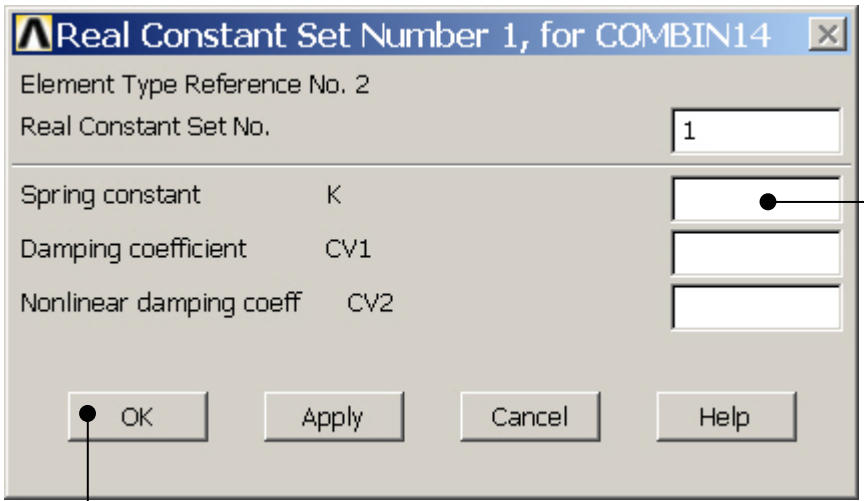
Preprocessor > Real Constants > Add



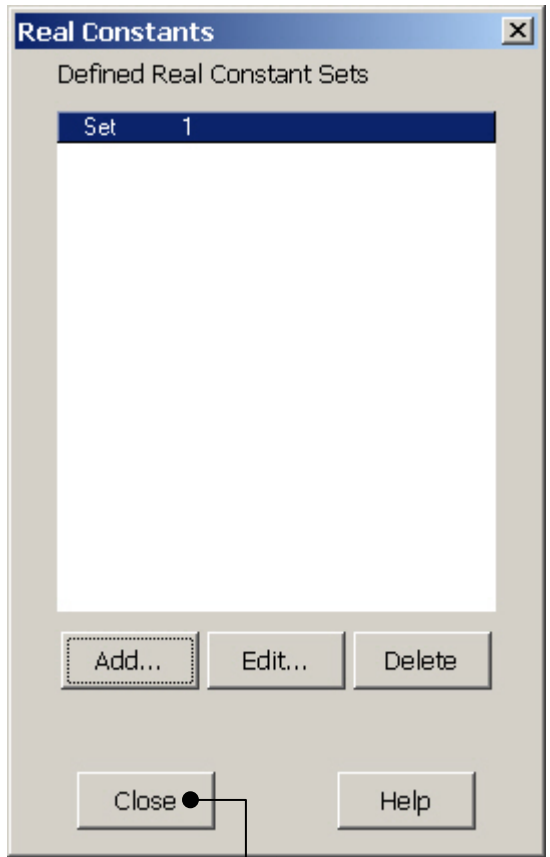
Place the cursor on the relevant element and press OK

Example - Real Constants

Preprocessor > Real Constants > Add



Enter 5 for Spring constant K

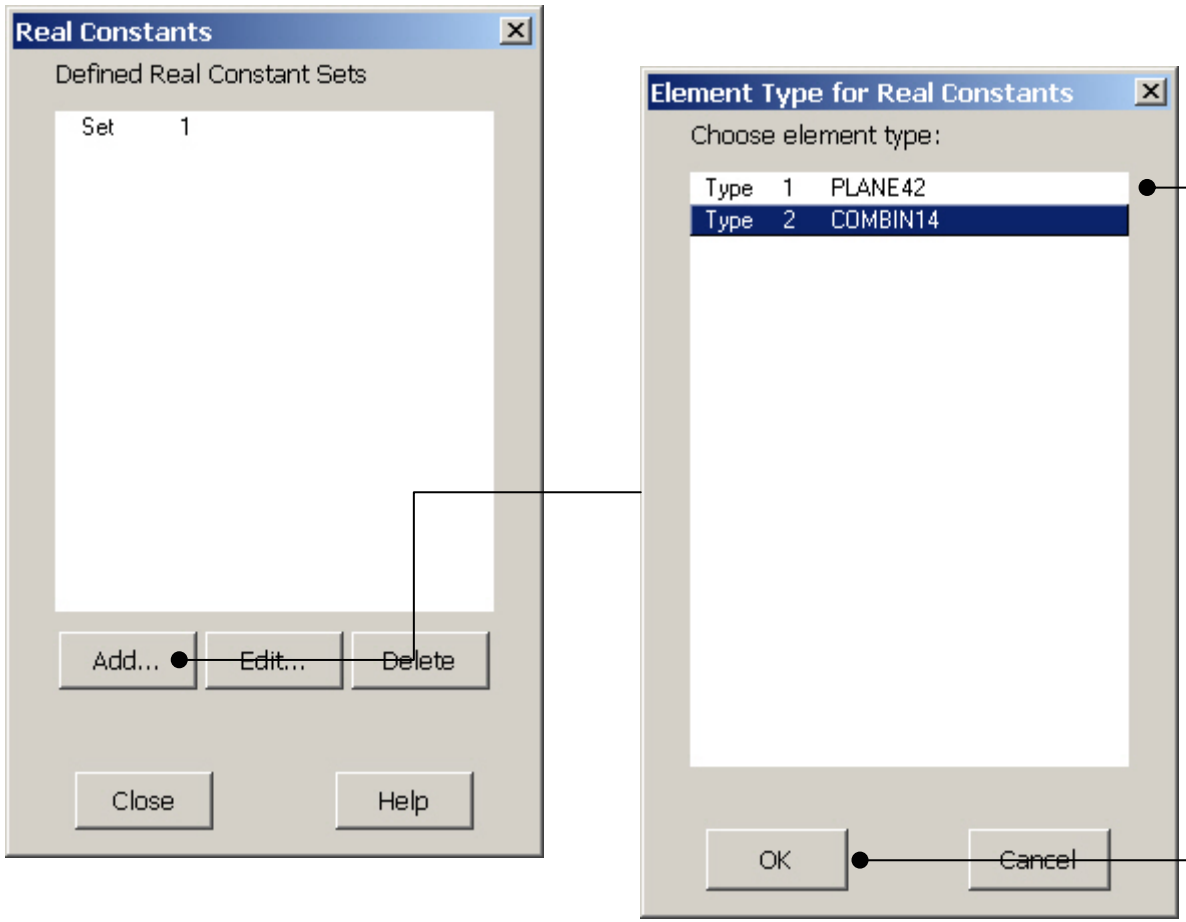


Press Close to finish

Press OK

Example – Real Constants

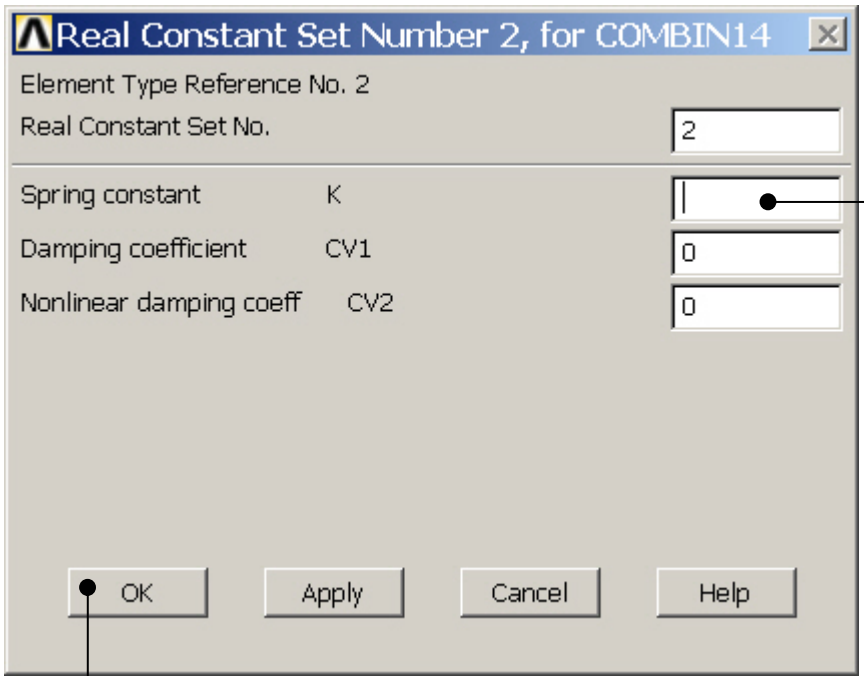
Preprocessor > Real Constants > Add



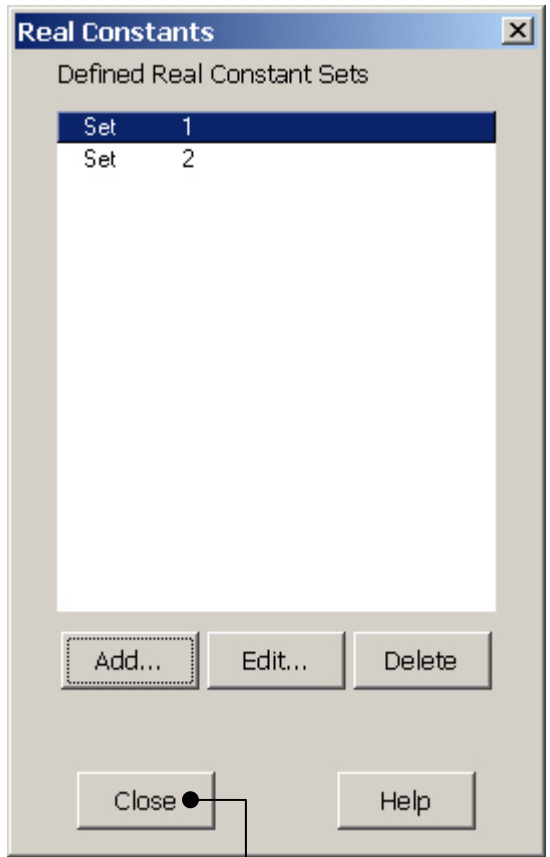
Place the cursor on the relevant element and press OK

Example - Real Constants

Preprocessor > Real Constants > Add



Enter 20 for Spring constant K

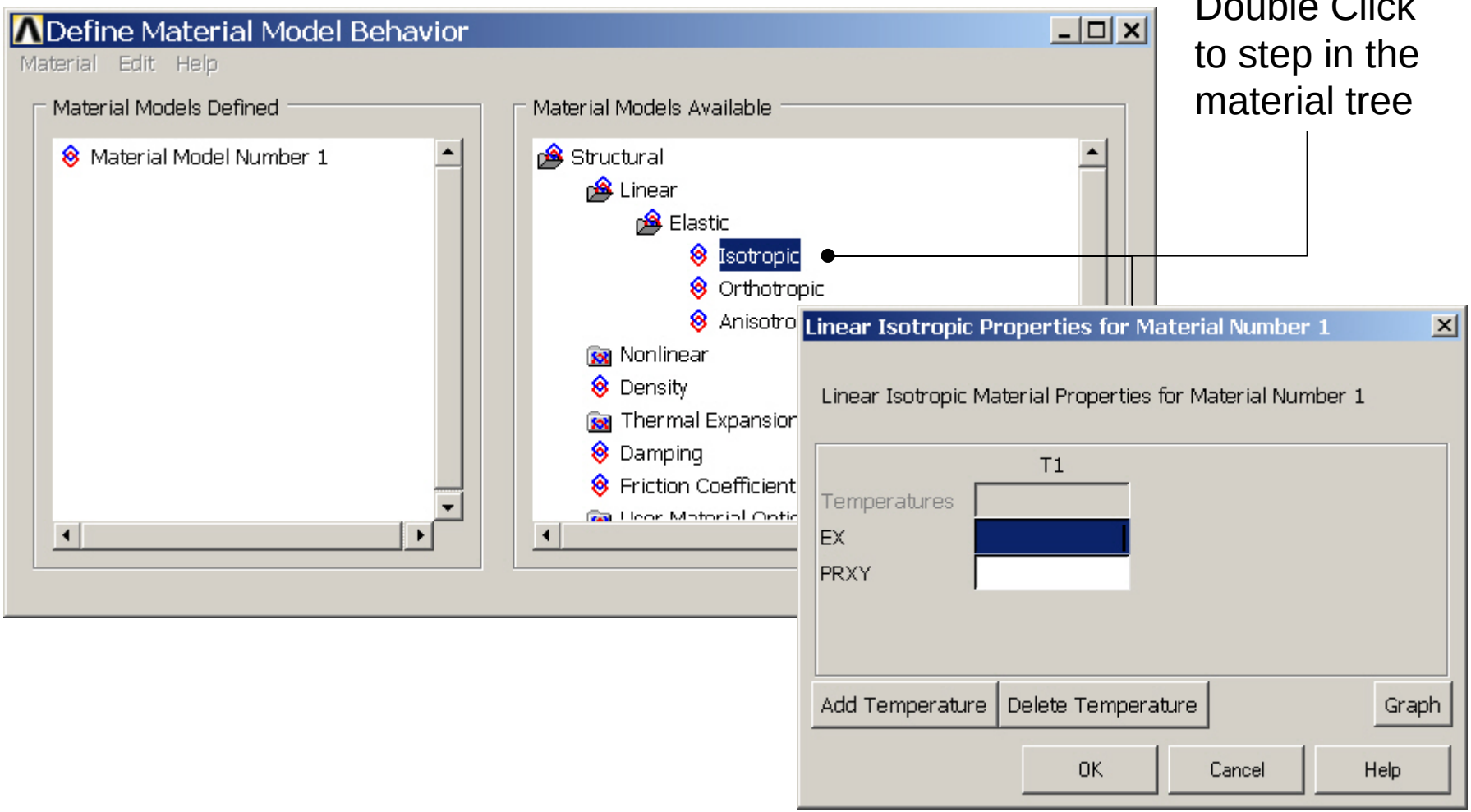


Press Close to finish

Press OK

Example - Material Properties

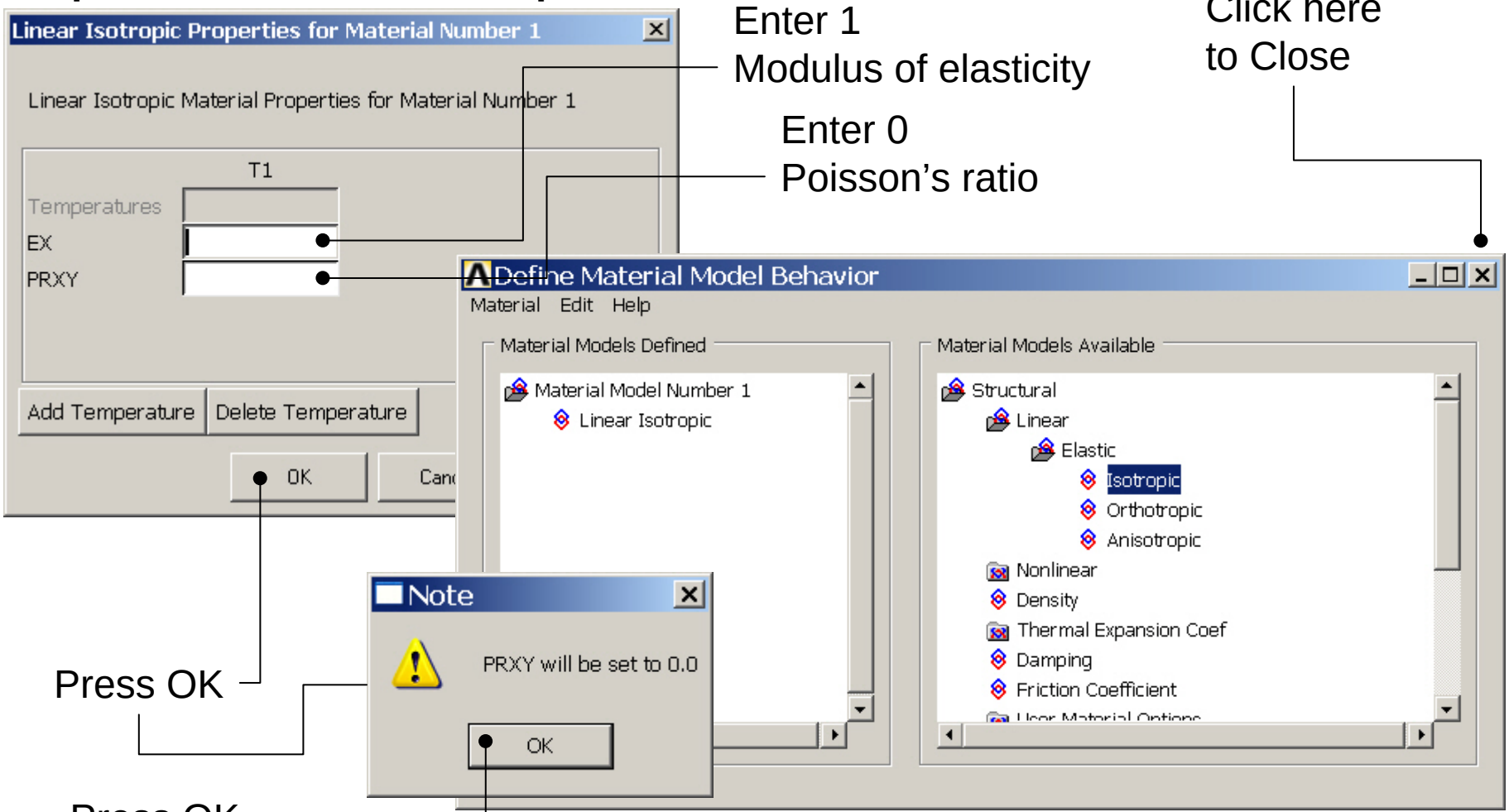
Preprocessor > Material Props > Material Models



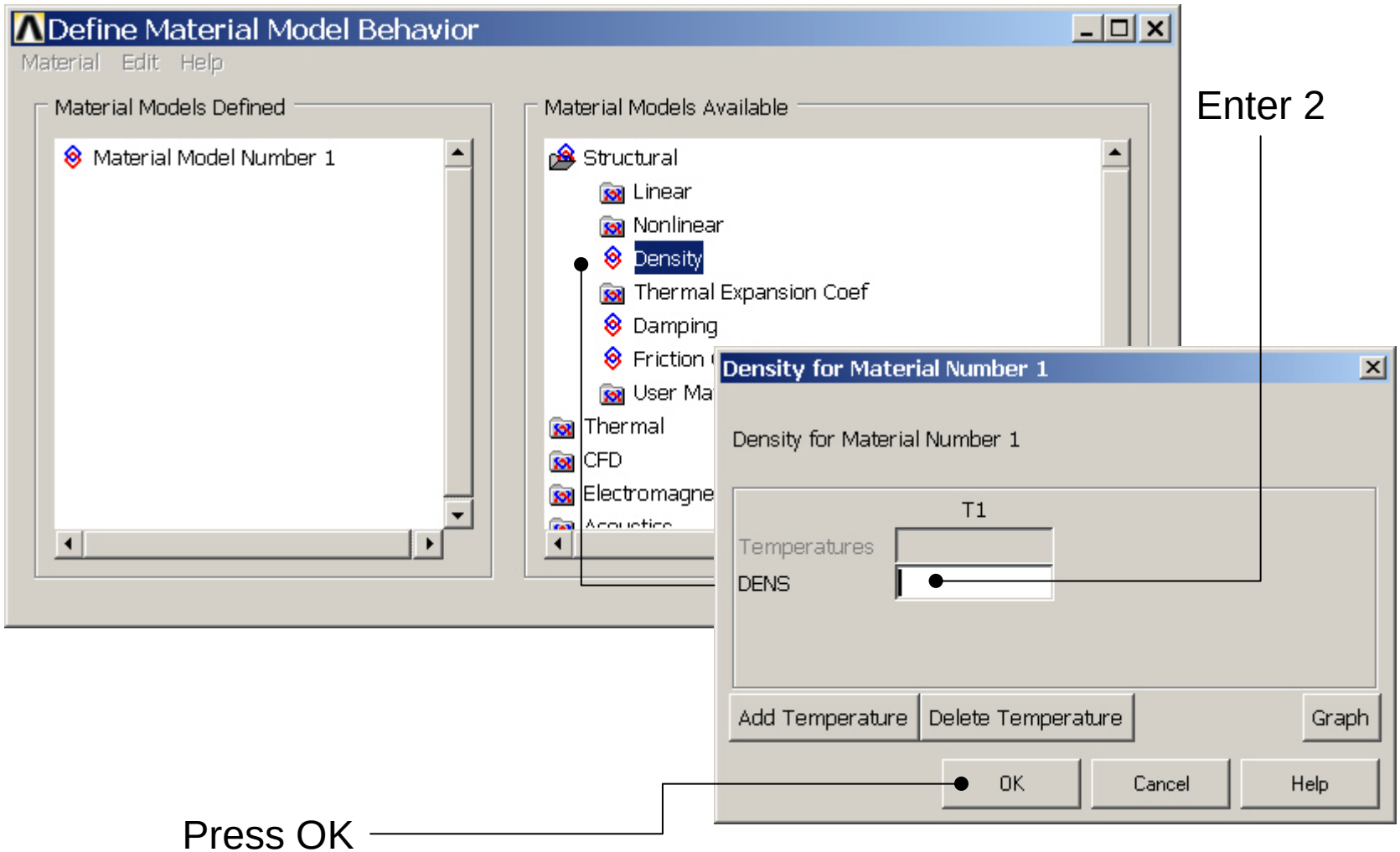
Double Click to step in the material tree

Example - Material Properties

Preprocessor > Material Props > Material Models

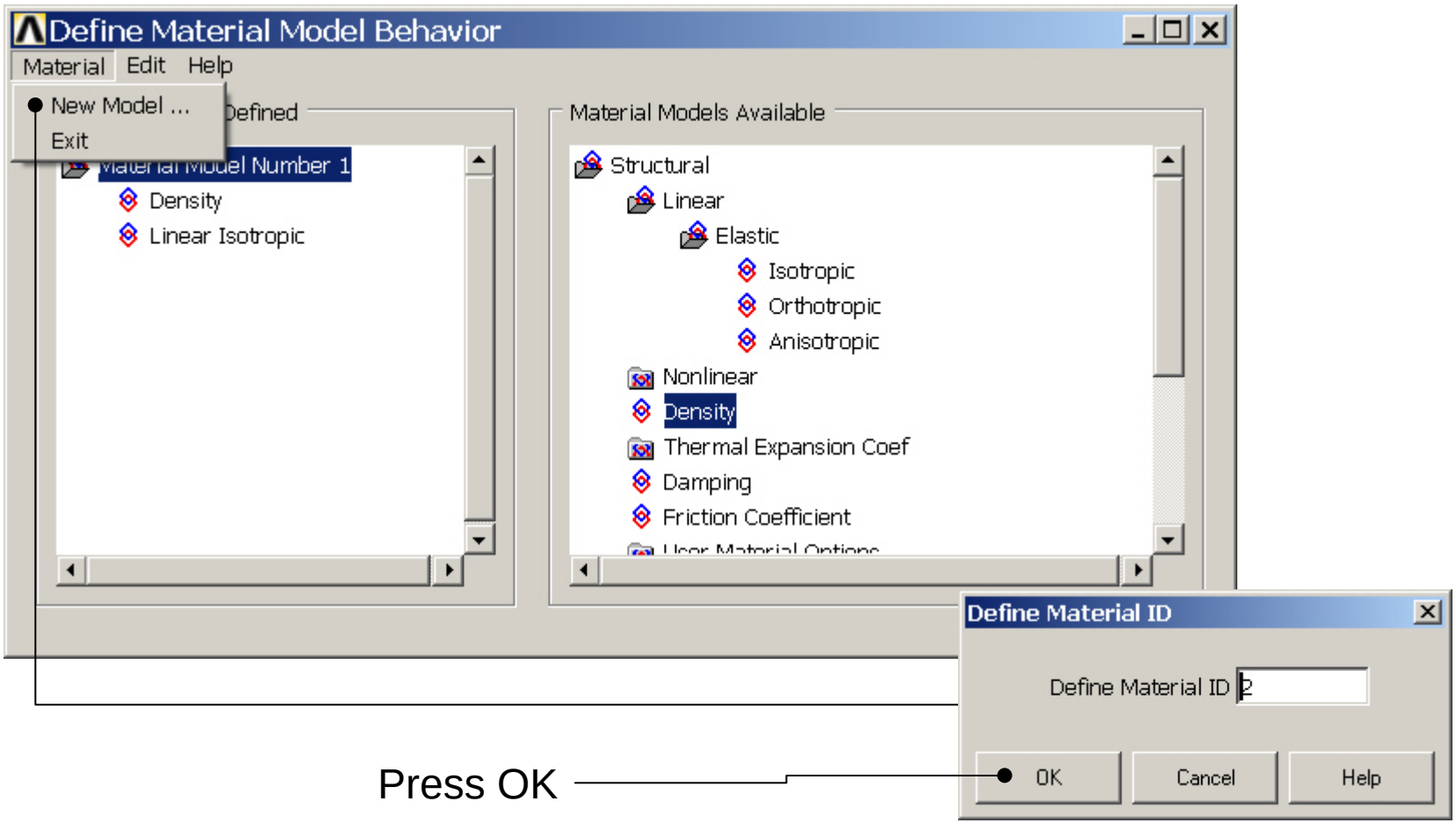


Example - Density



Example - Material Properties

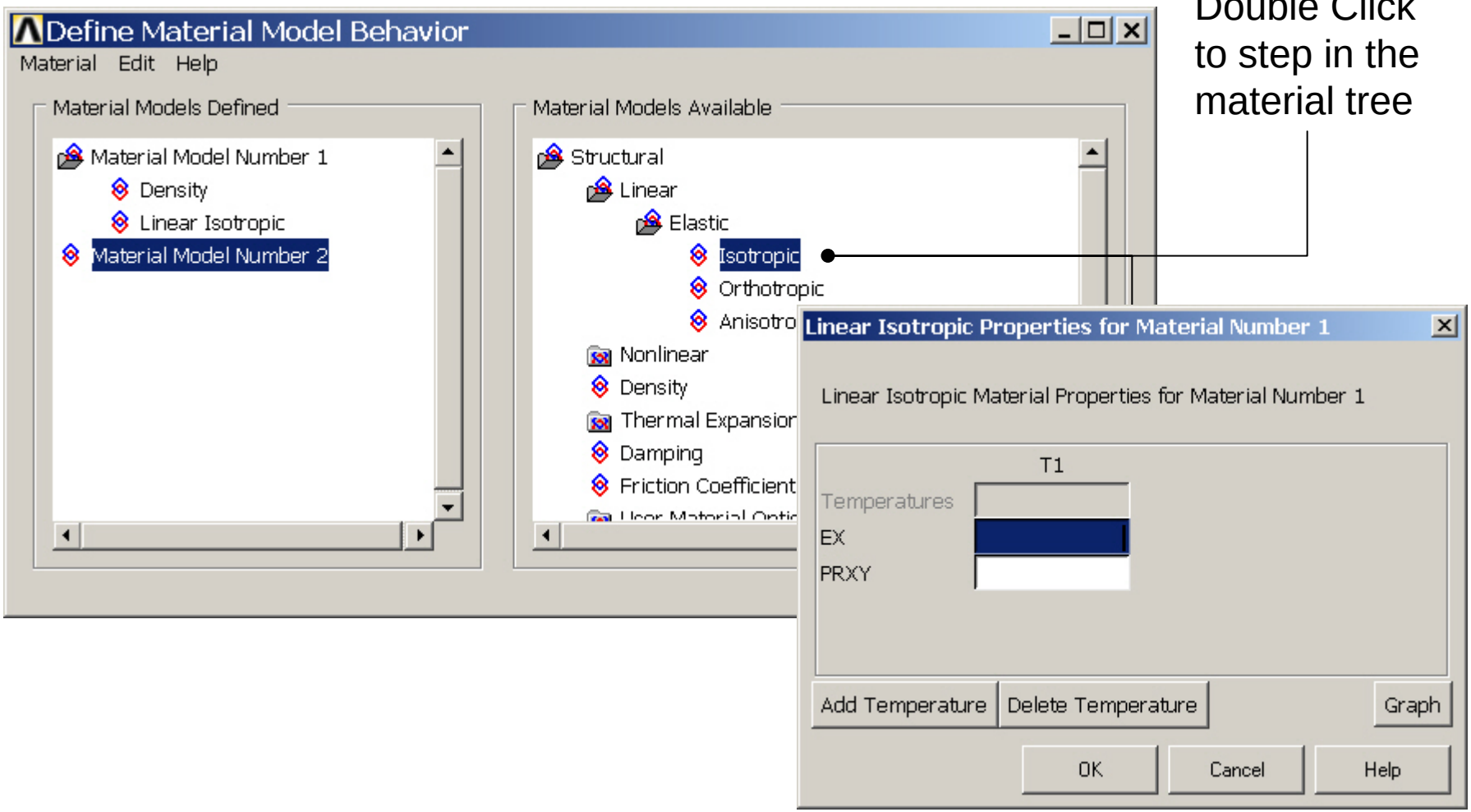
Preprocessor > Material Props > Material Models



Press OK

Example - Material Properties

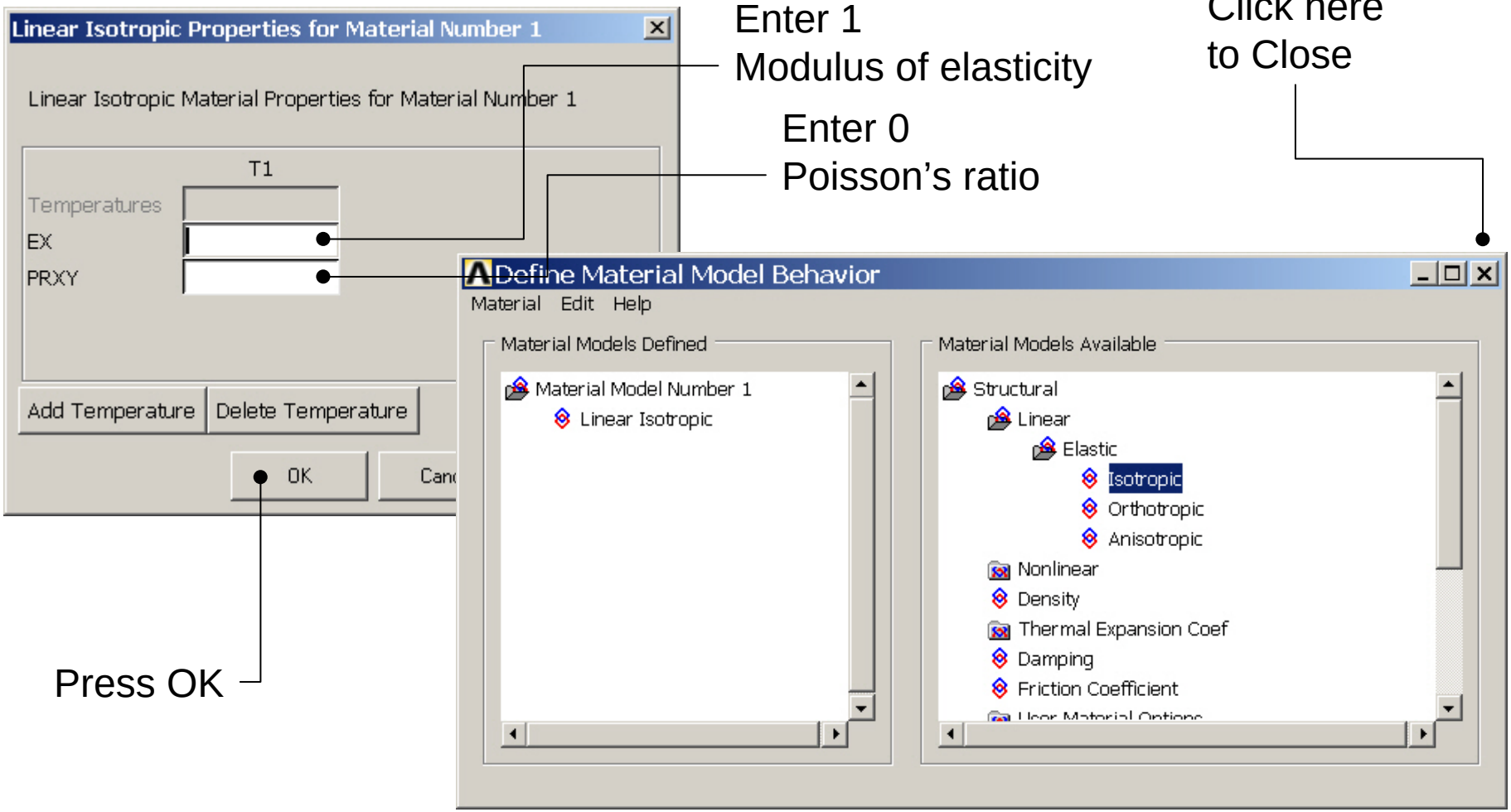
Preprocessor > Material Props > Material Models



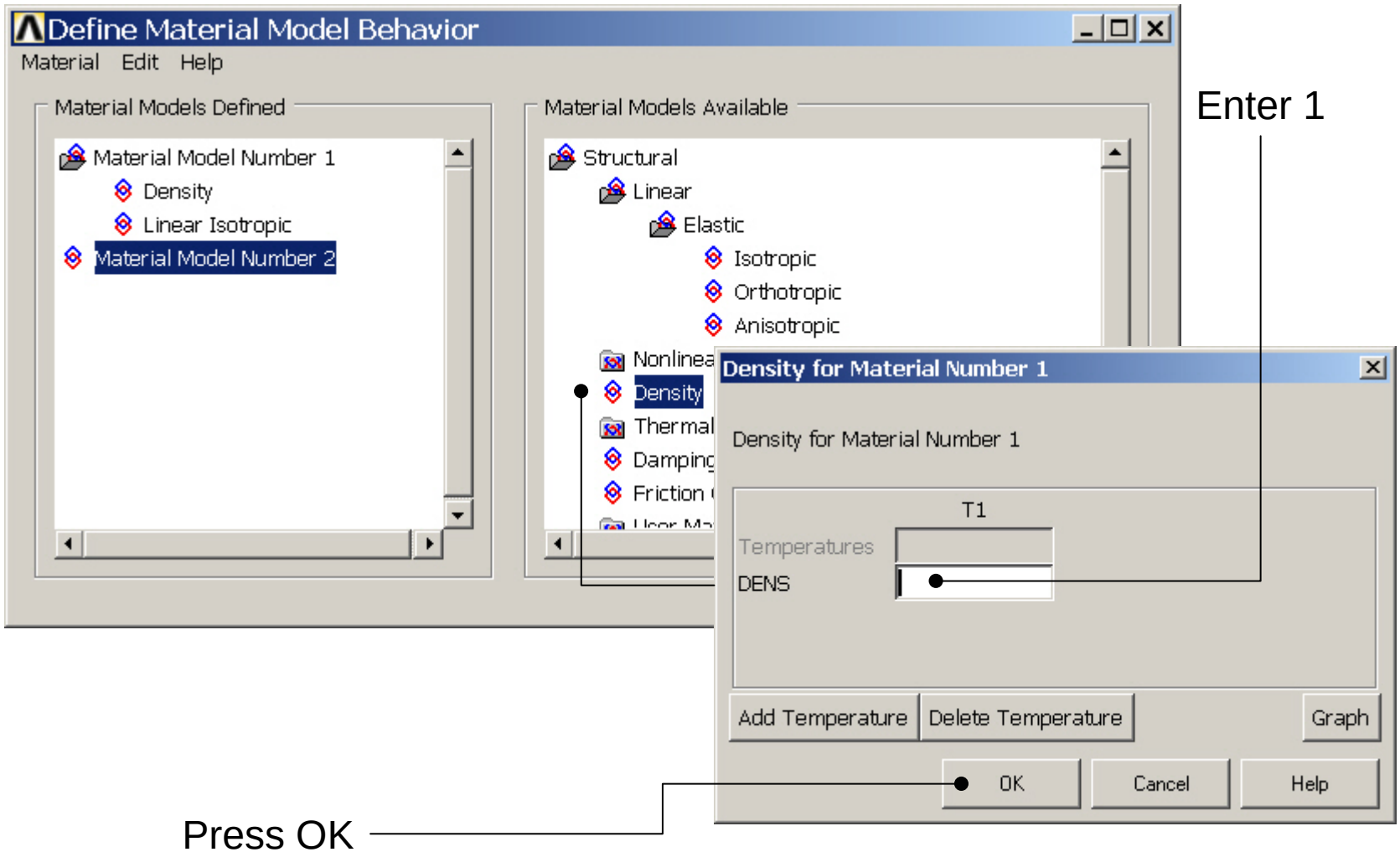
Double Click to step in the material tree

Example - Material Properties

Preprocessor > Material Props > Material Models

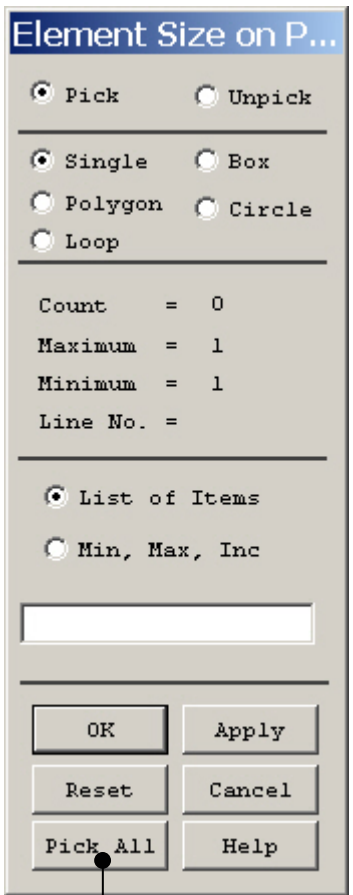


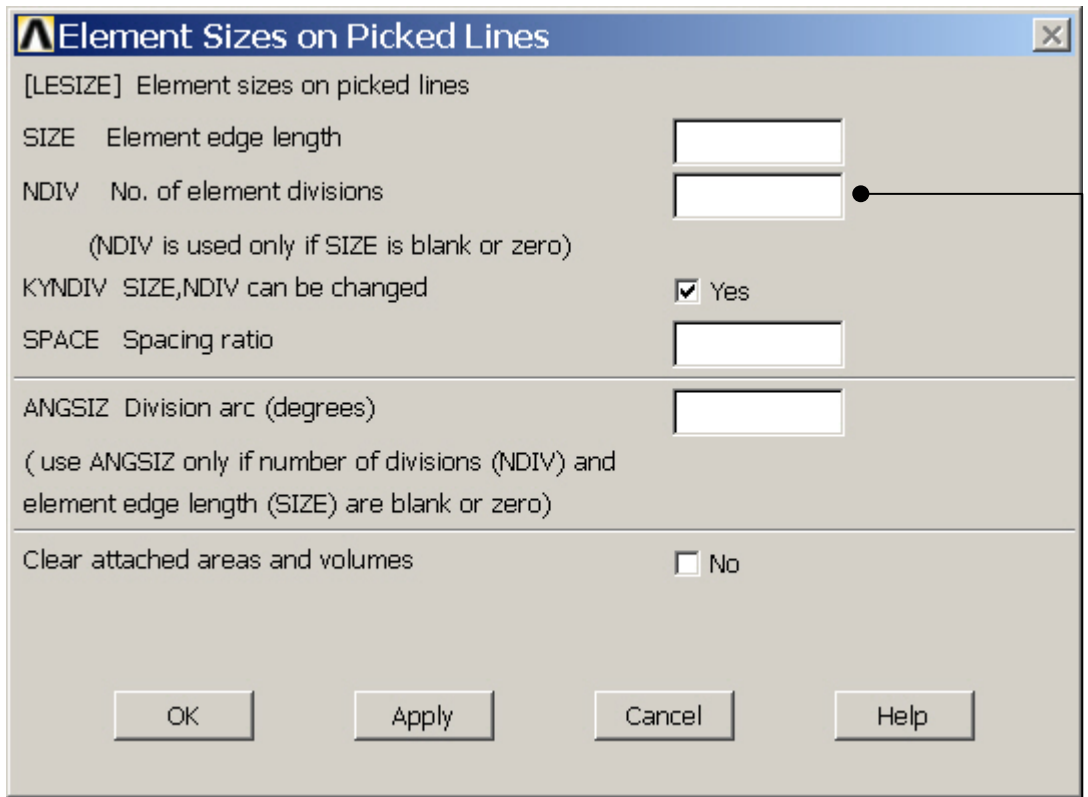
Example - Density



Example - Meshing

Preprocessor > Meshing > Size Cntrls > ManualSize > Lines > Picked Lines





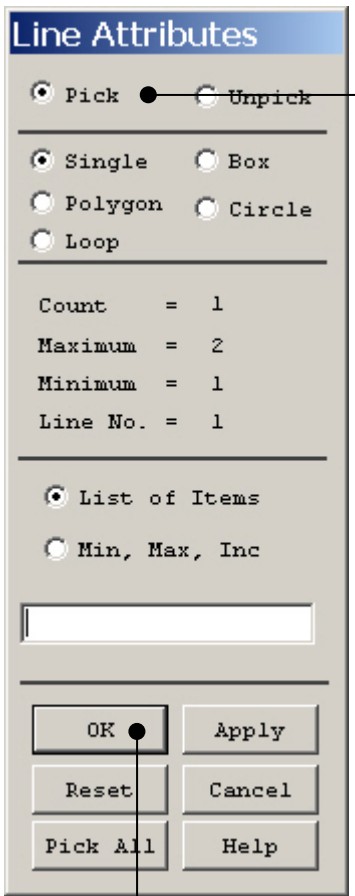
Select/Pick Lines to specify mesh size for

Press Pick All when finish with selection

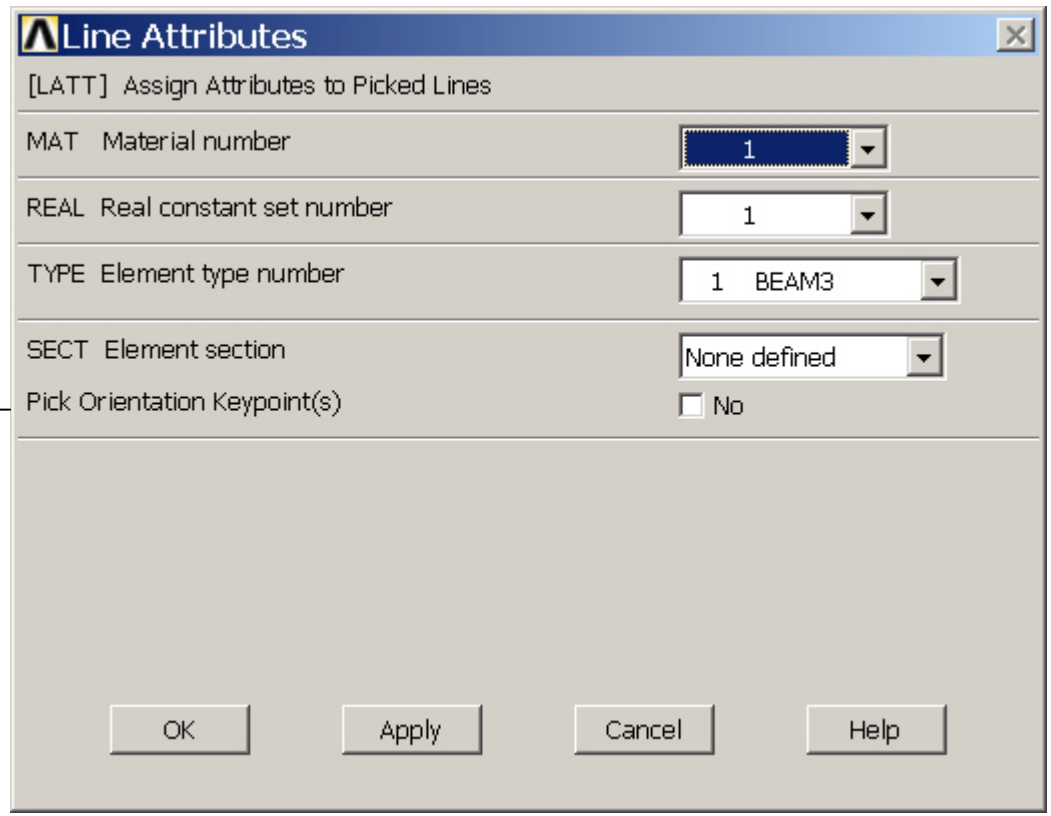
Enter 2

Example – Mesh Attributes

Preprocessor > Meshing > Mesh Attributes > Area Attributes > Picked Lines



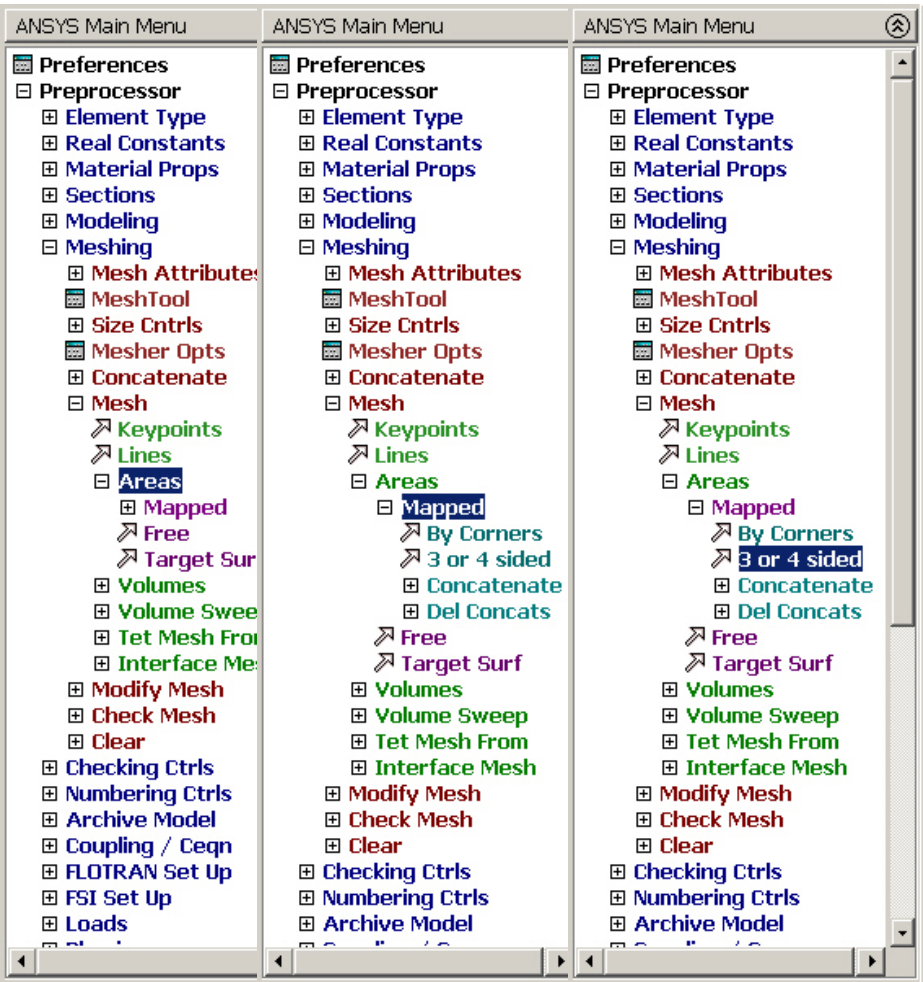
Select Line 1

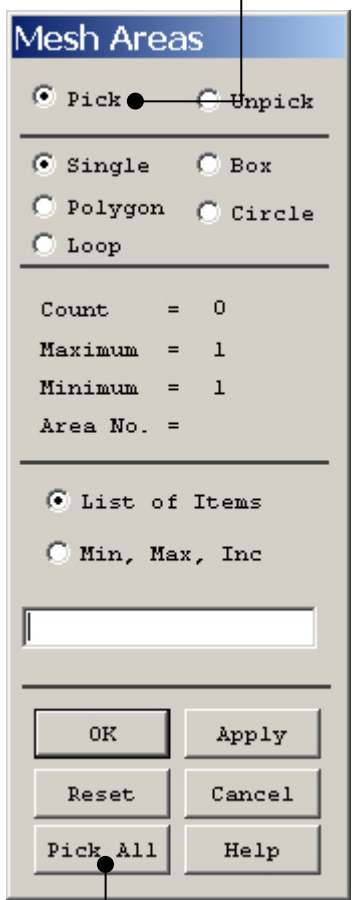


Press OK

Example - Meshing

Preprocessor > Meshing > Mesh > Areas > Mapped > 3 or 4 sided



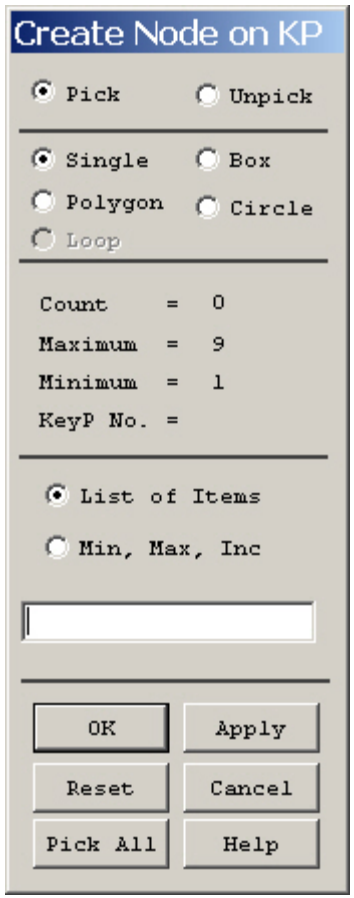


Select individual areas to be meshed

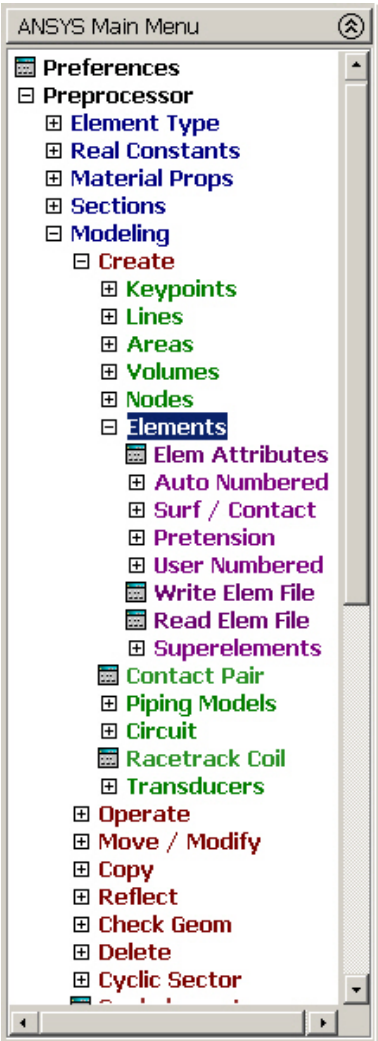
NB: It is often necessary to “Clear” the model for example if Element Type or model geometry is to be changed

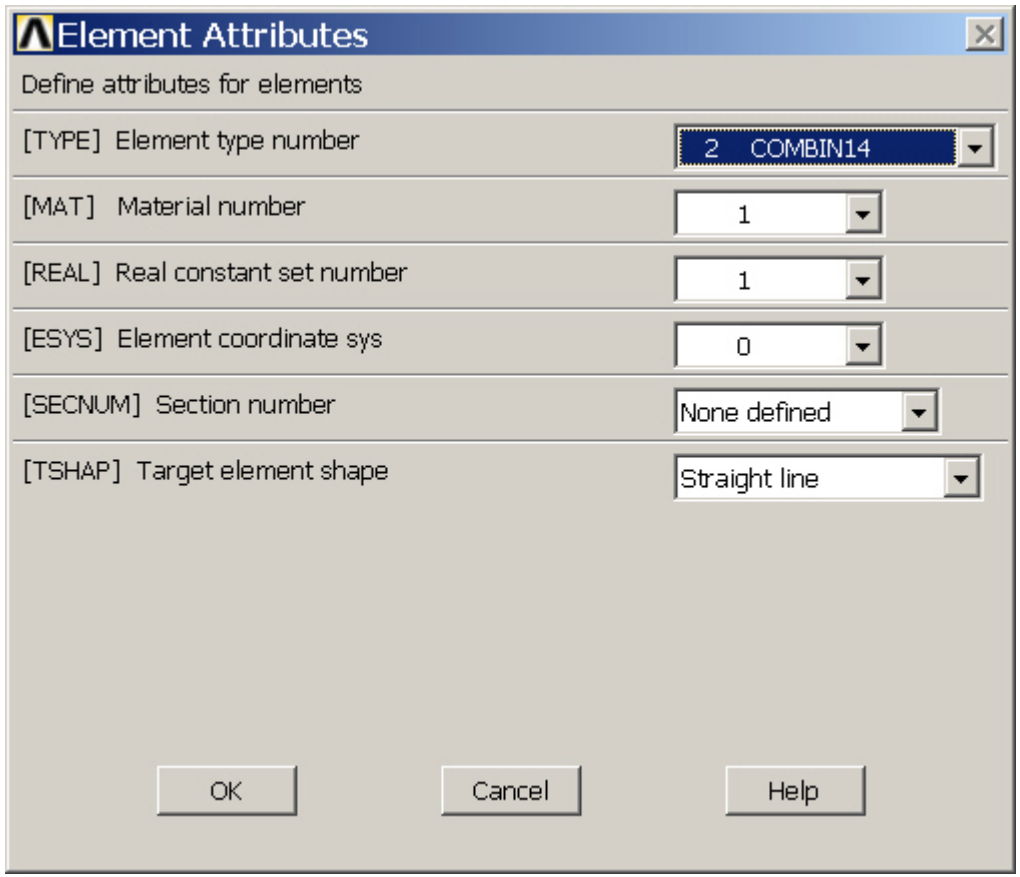
Select all areas defined to be meshed

Example – Create Node

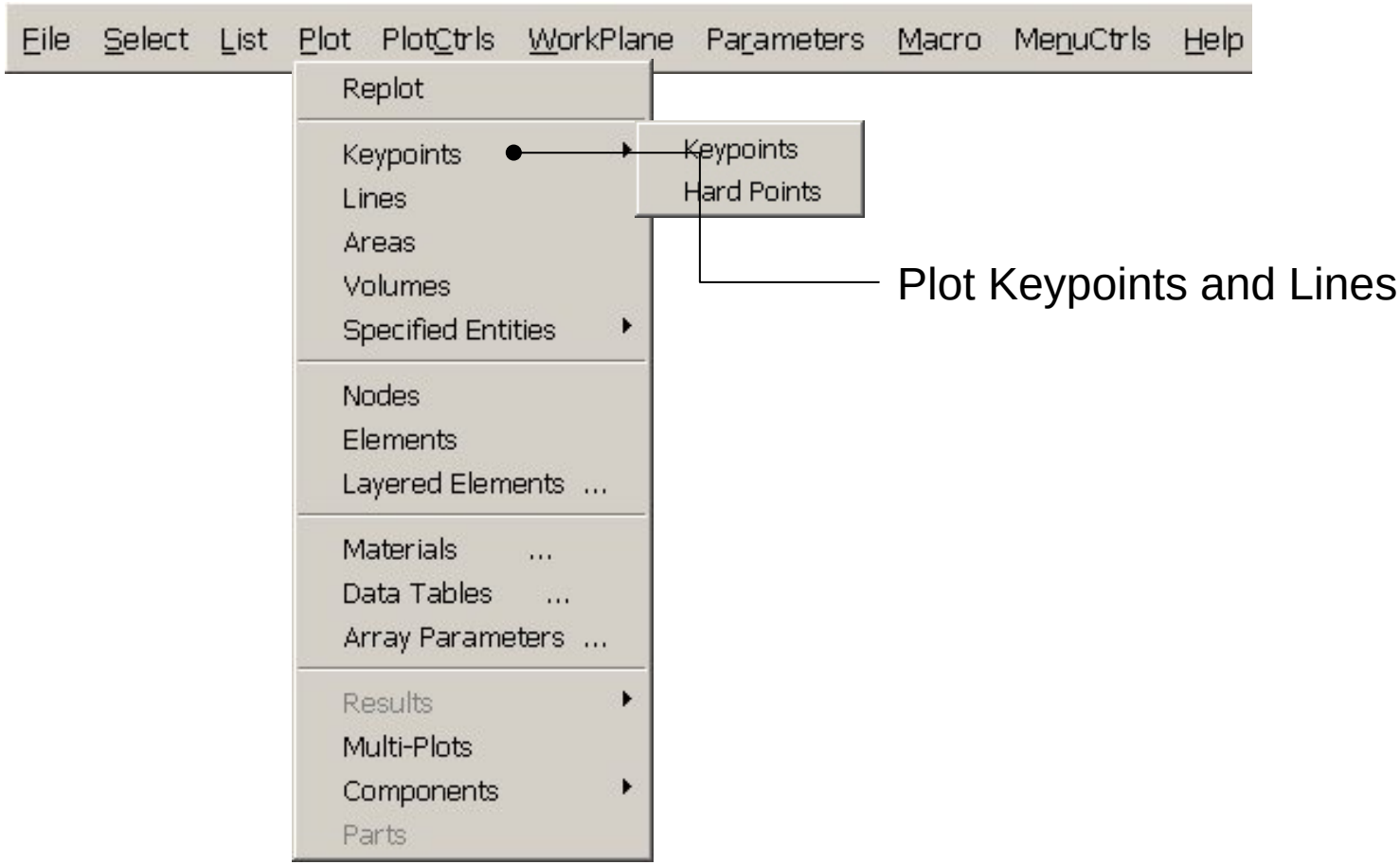


Example – Element attributes

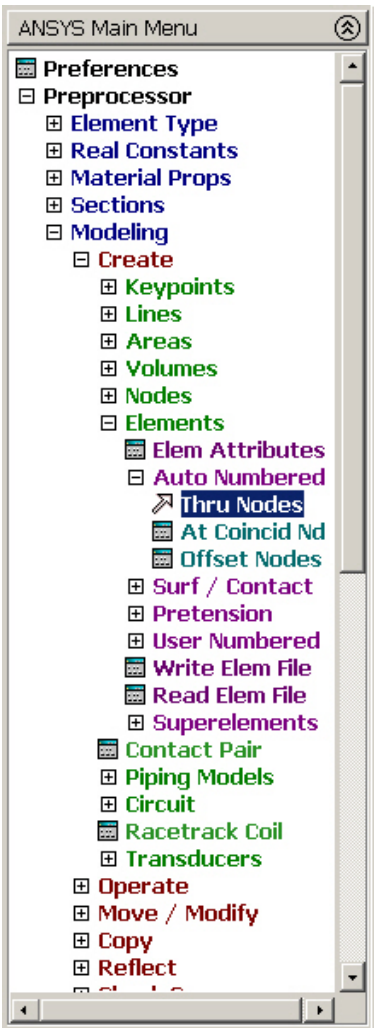


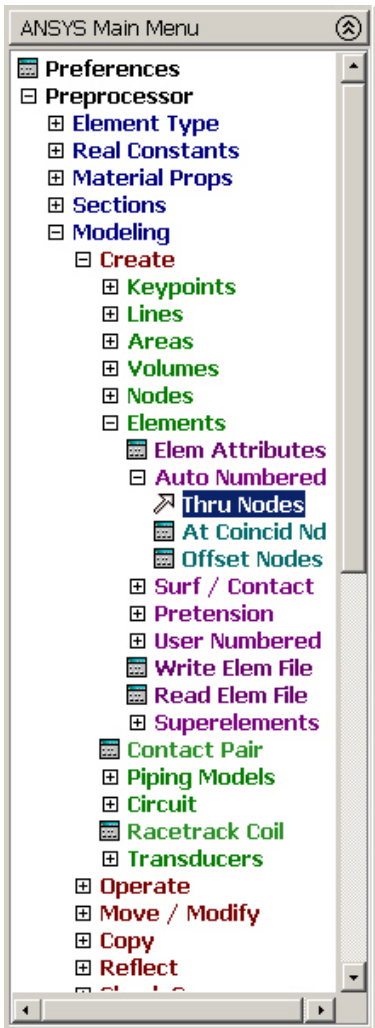


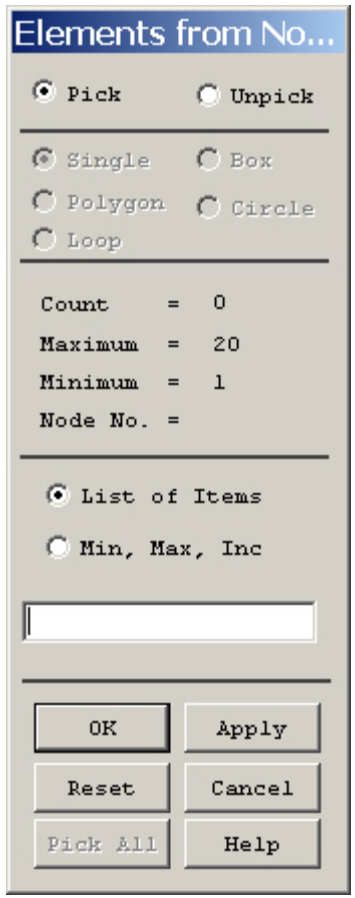
Example - Plot



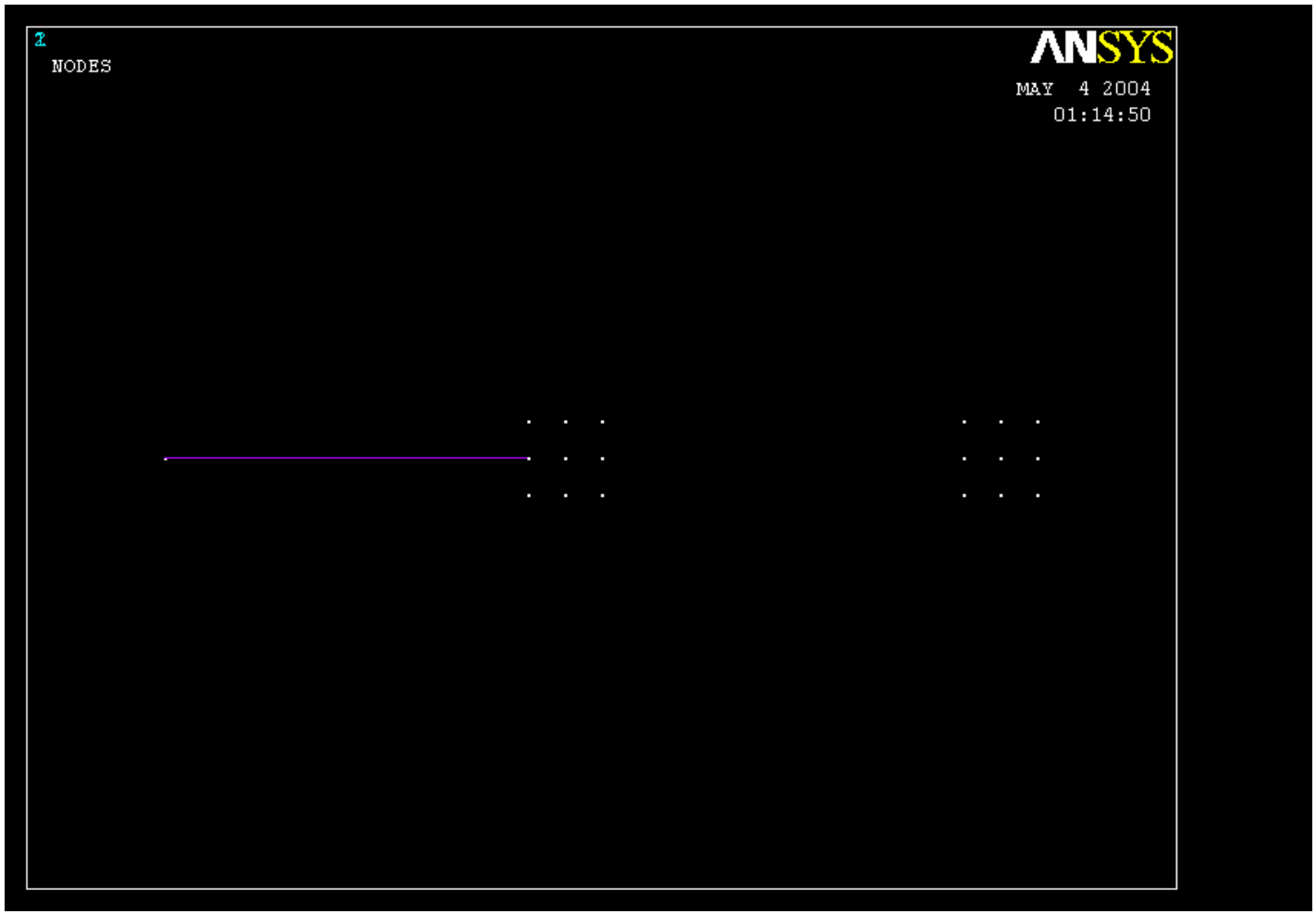
Example – Create Elements



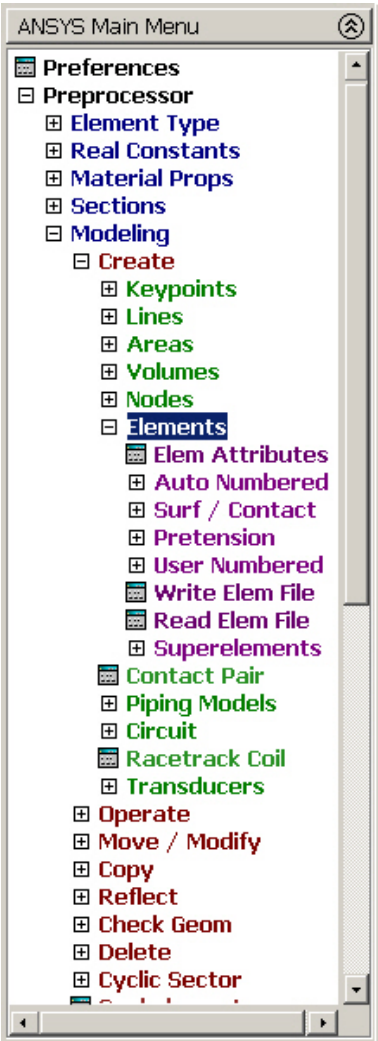


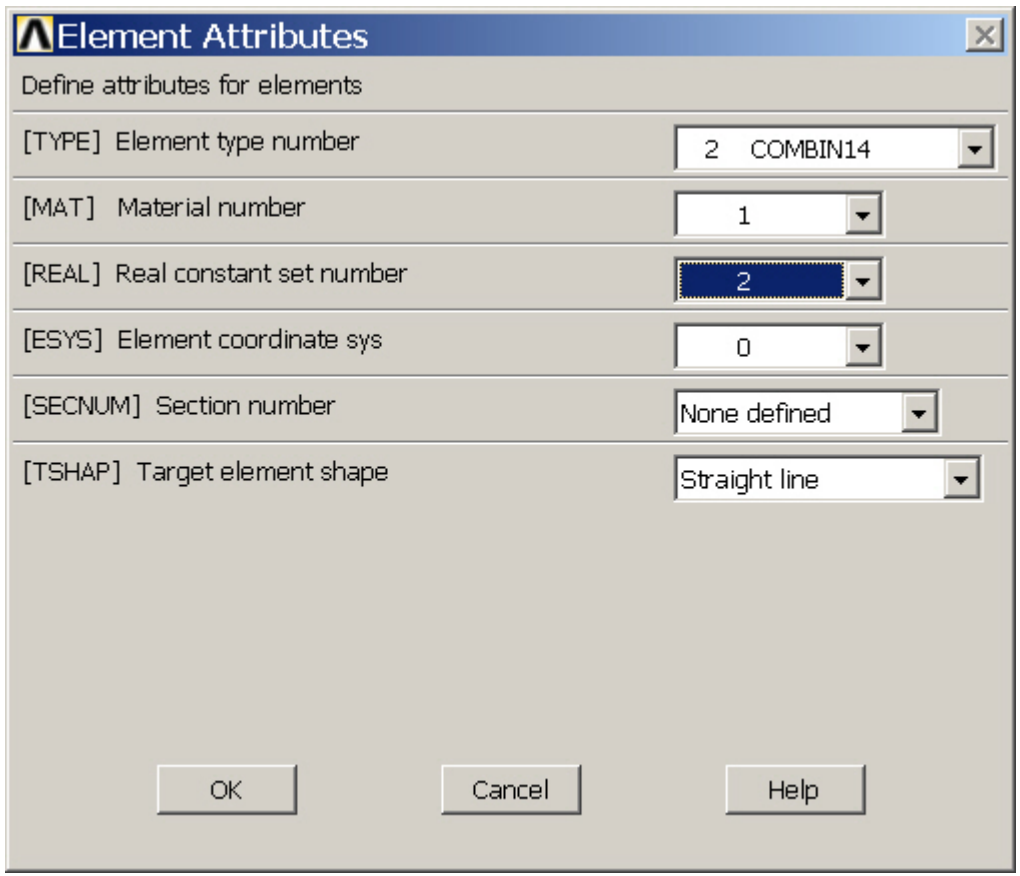


Example – Create Elements

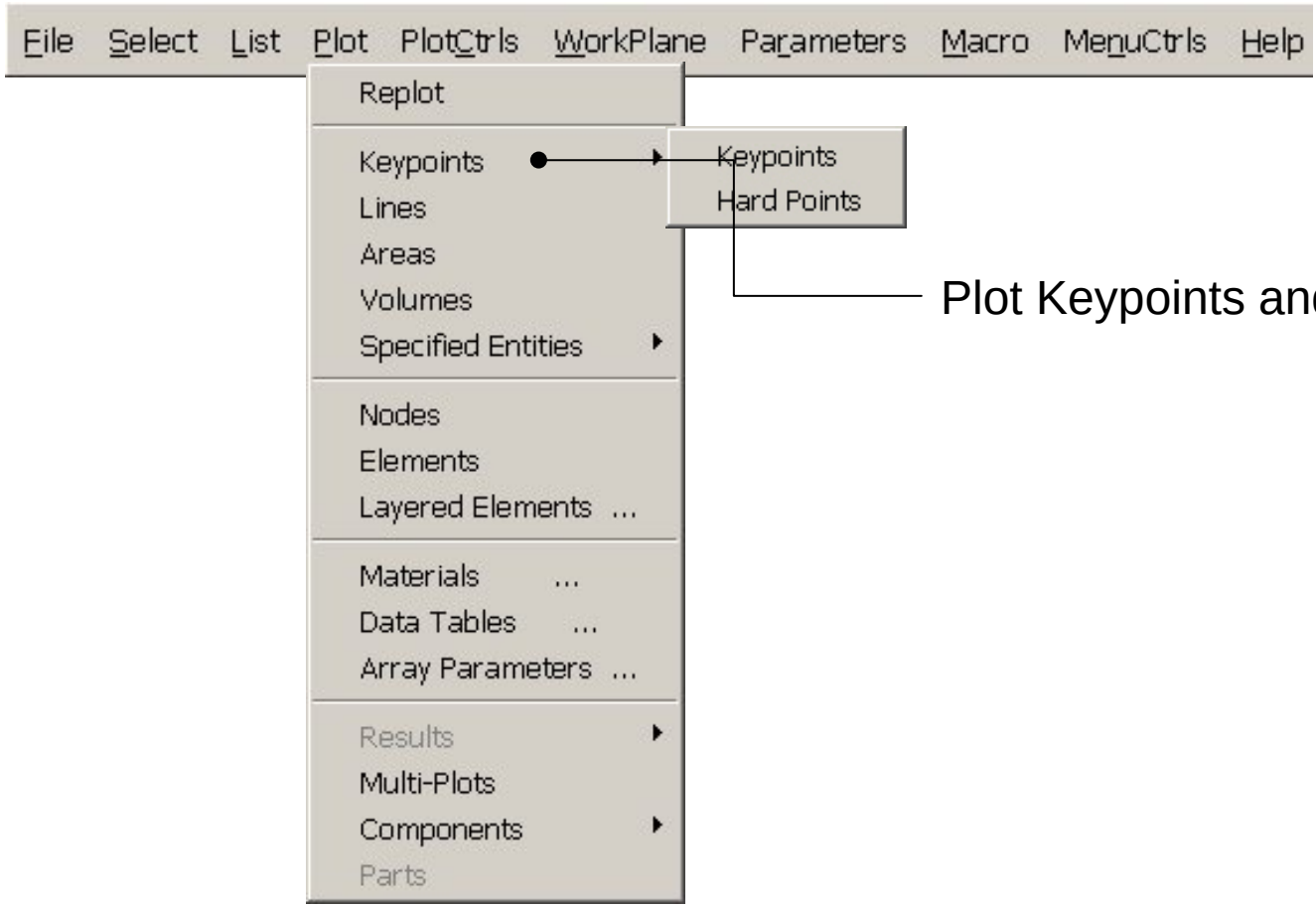


Example – Element attributes



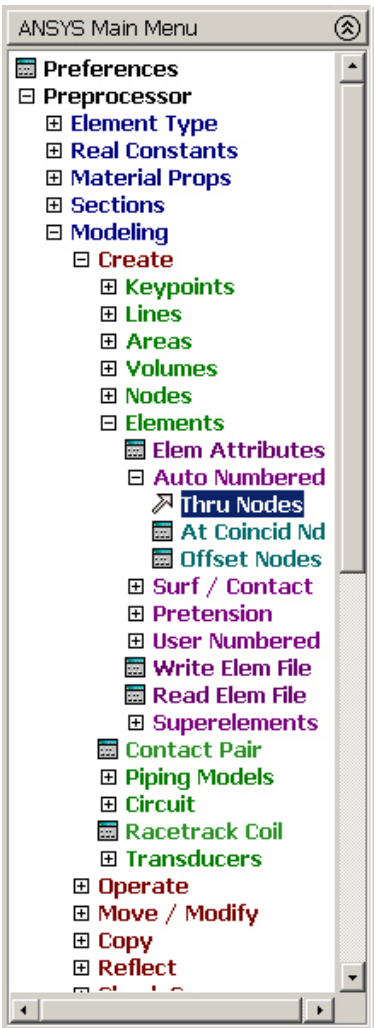


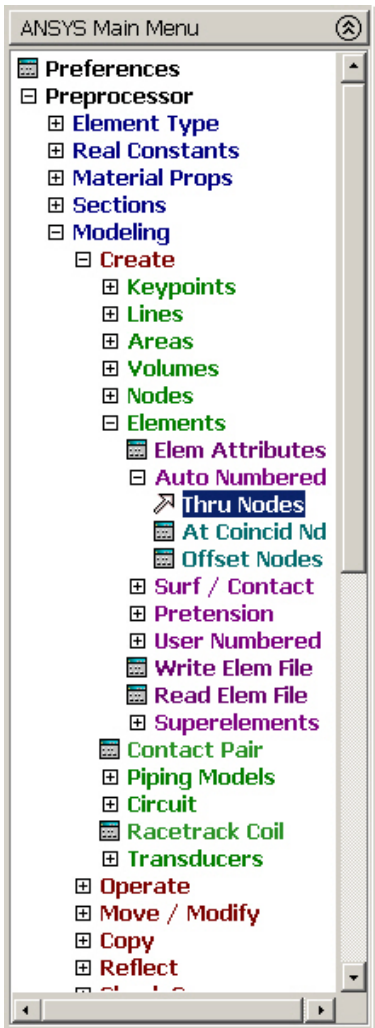
Example - Plot

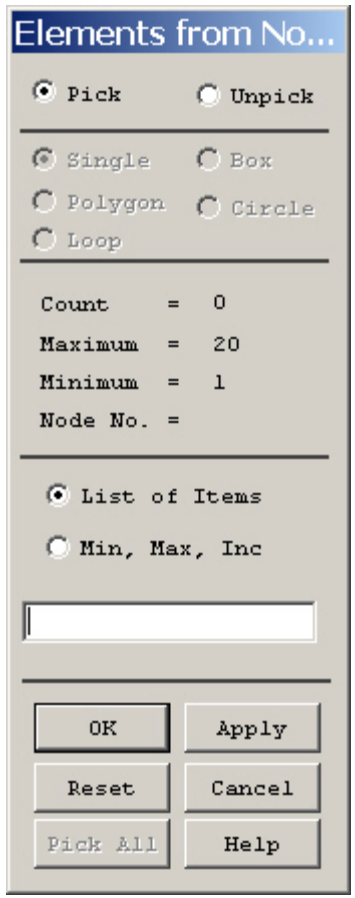


Plot Keypoints and Lines

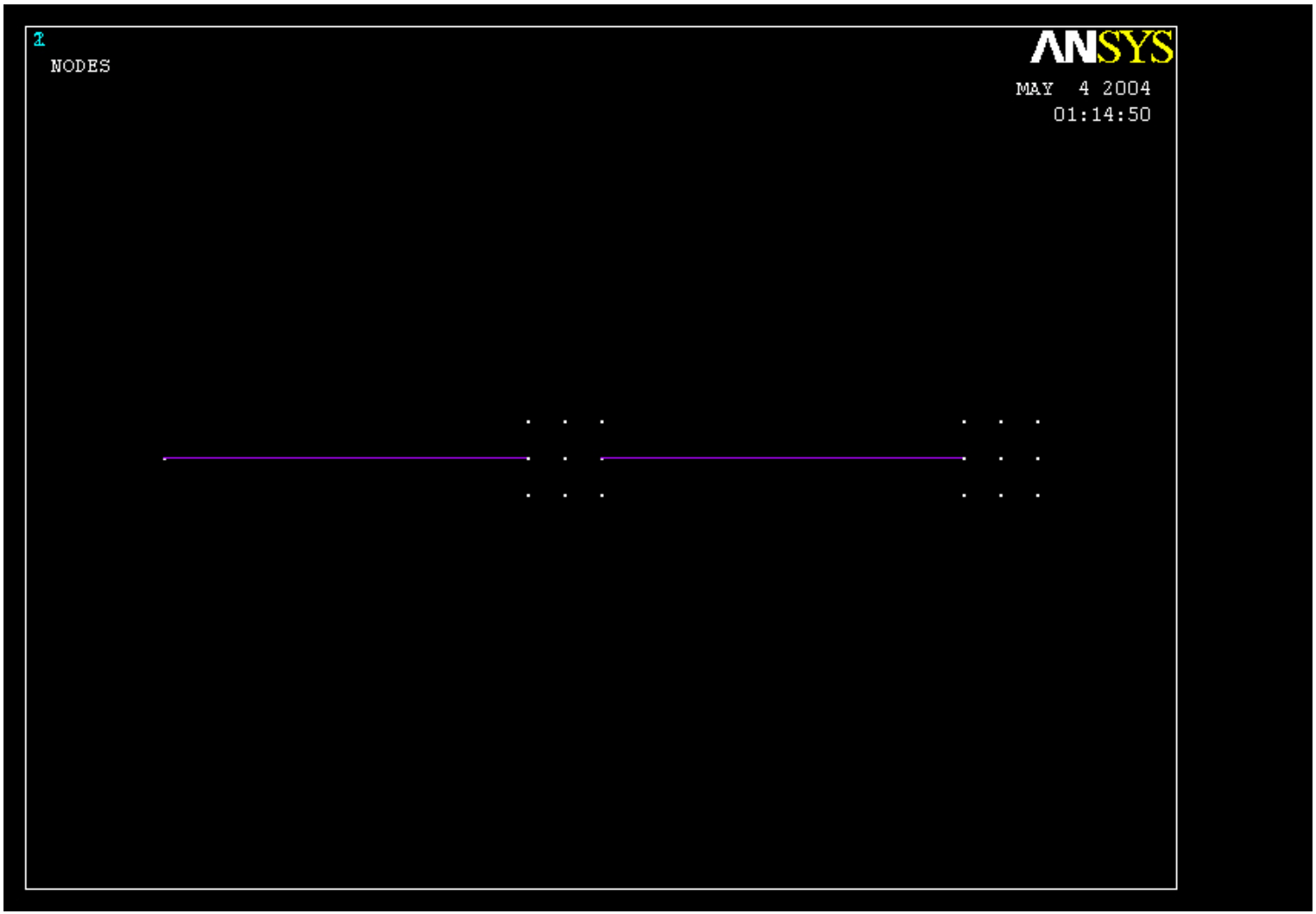
Example – Create Elements







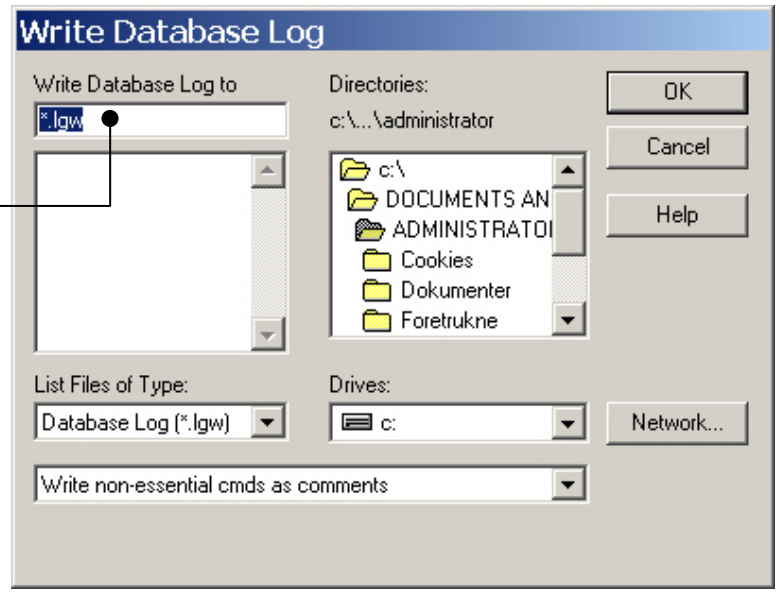
Example – Create Elements



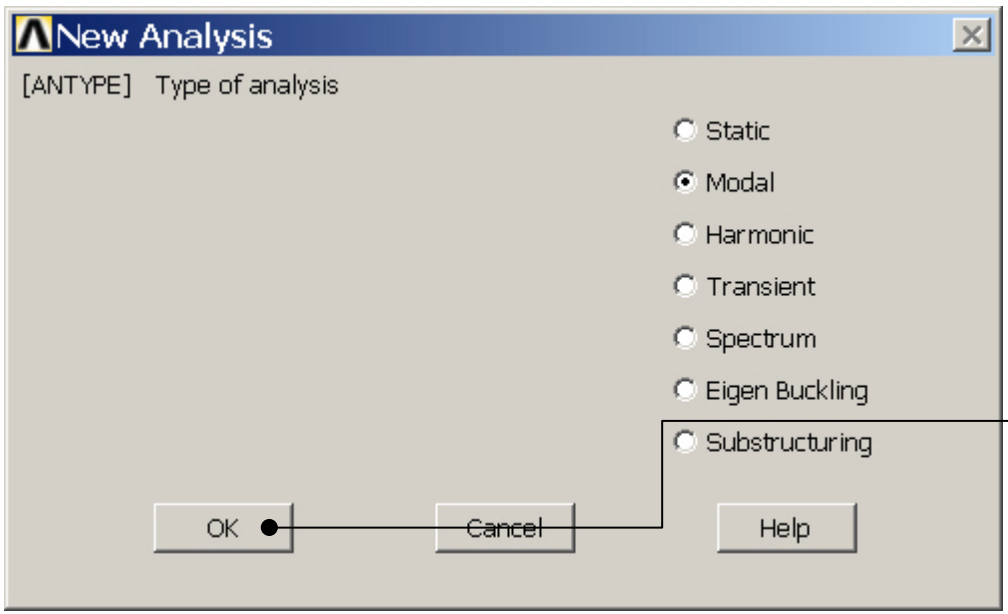
Example – Analysis Type

File > Write DB log file

Enter “example0430.lgw”

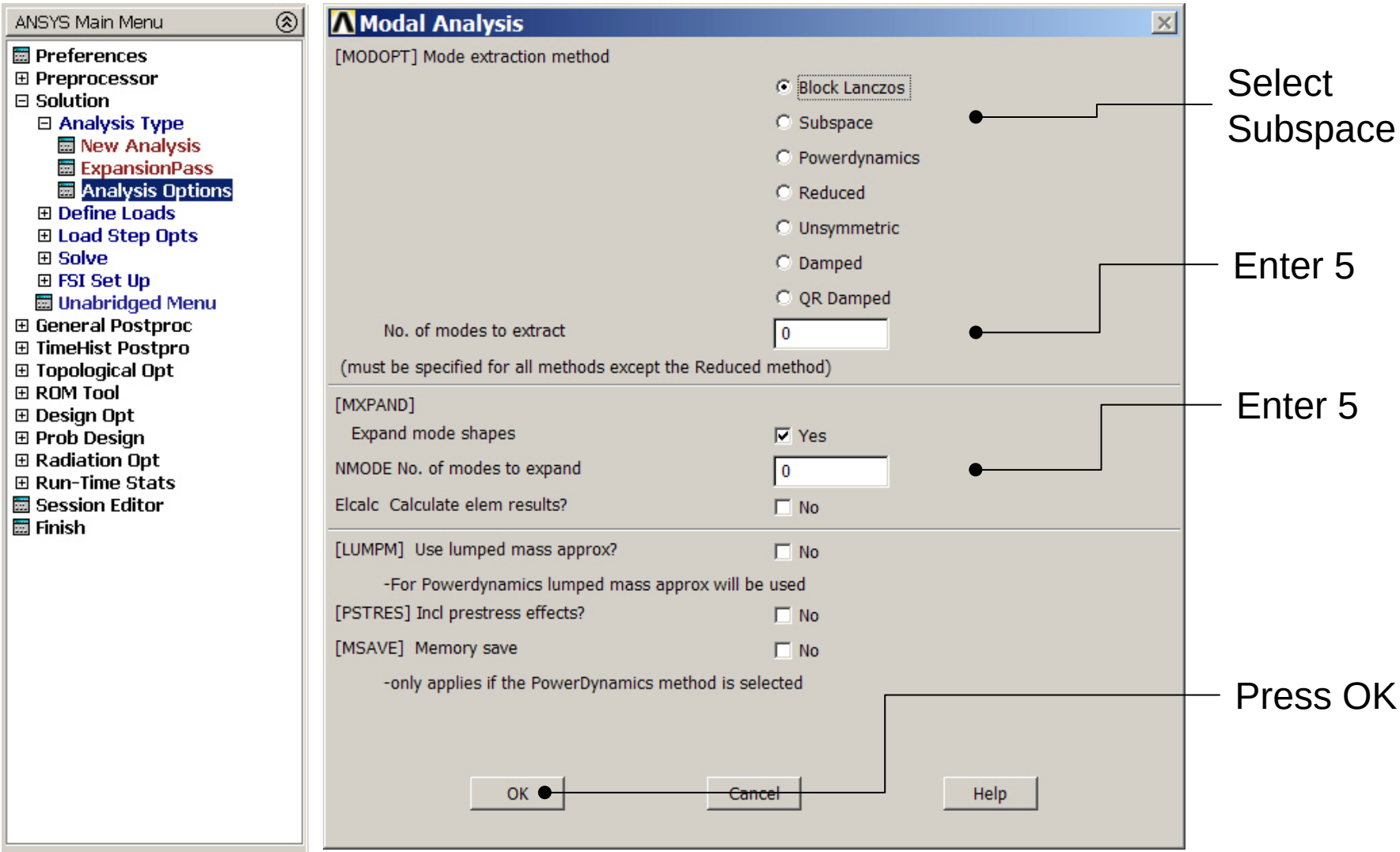


Solution > Analysis Type > New Analysis

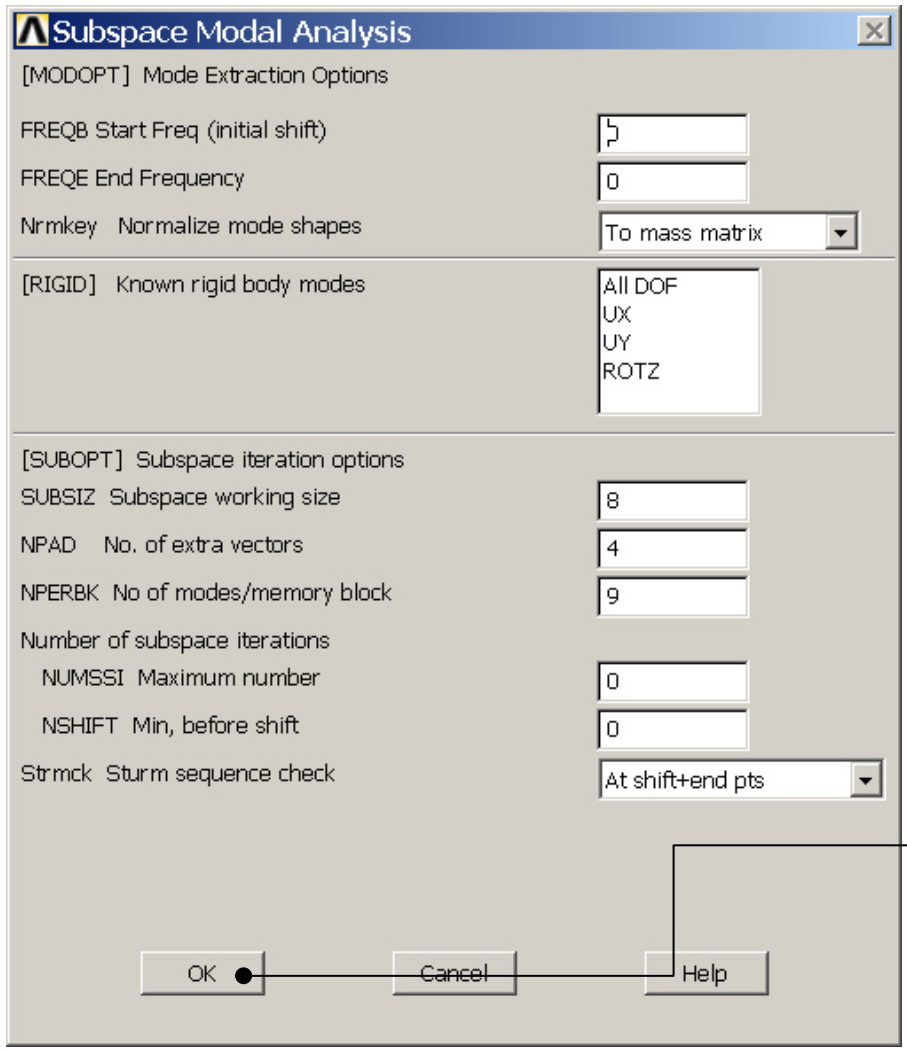


Press OK

Example – MA Analysis Options



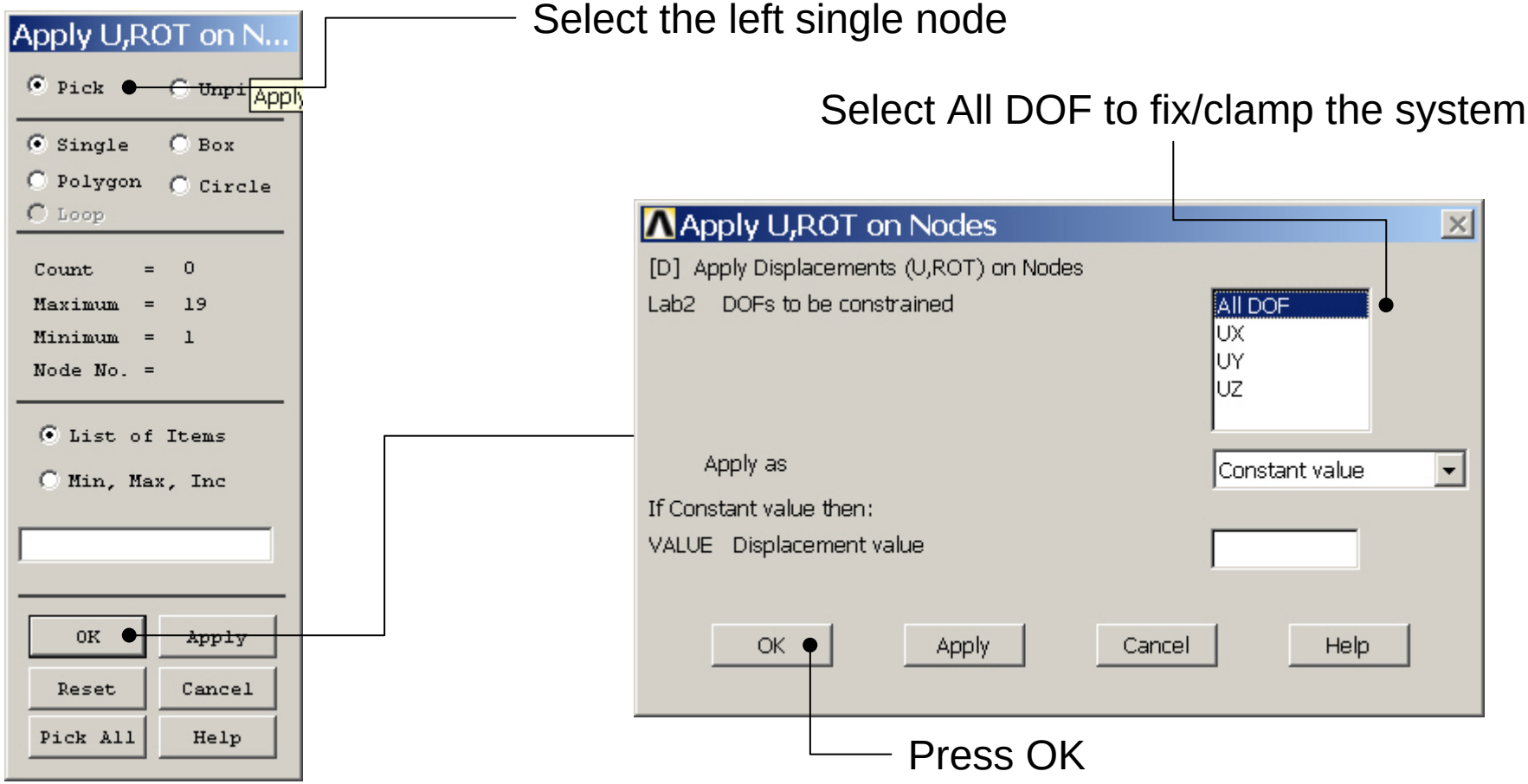
Example – Subspace Options



Press OK

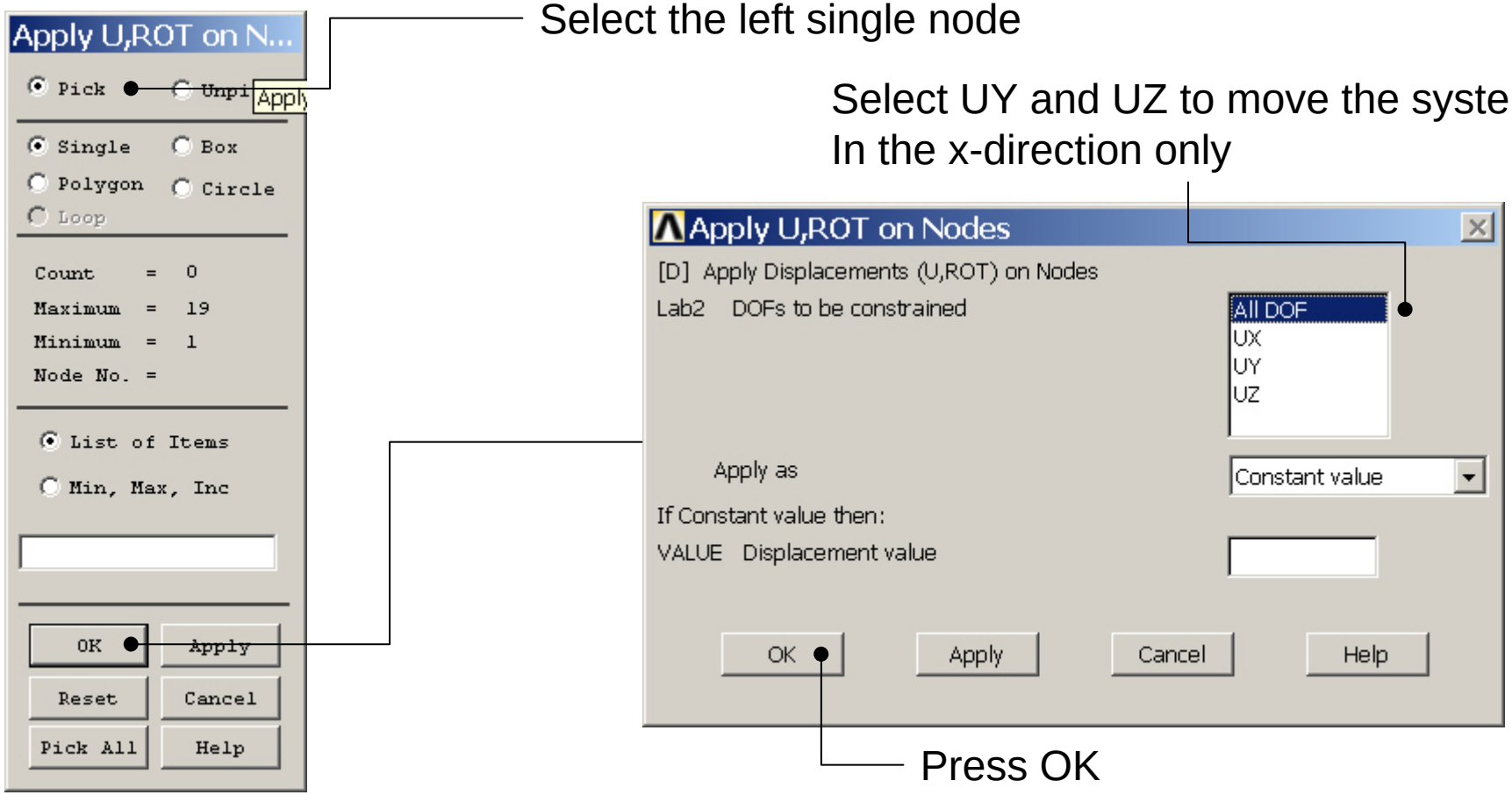
Example – Define Loads

Solution > Define Loads > Apply > Structural > Displacement > On Nodes

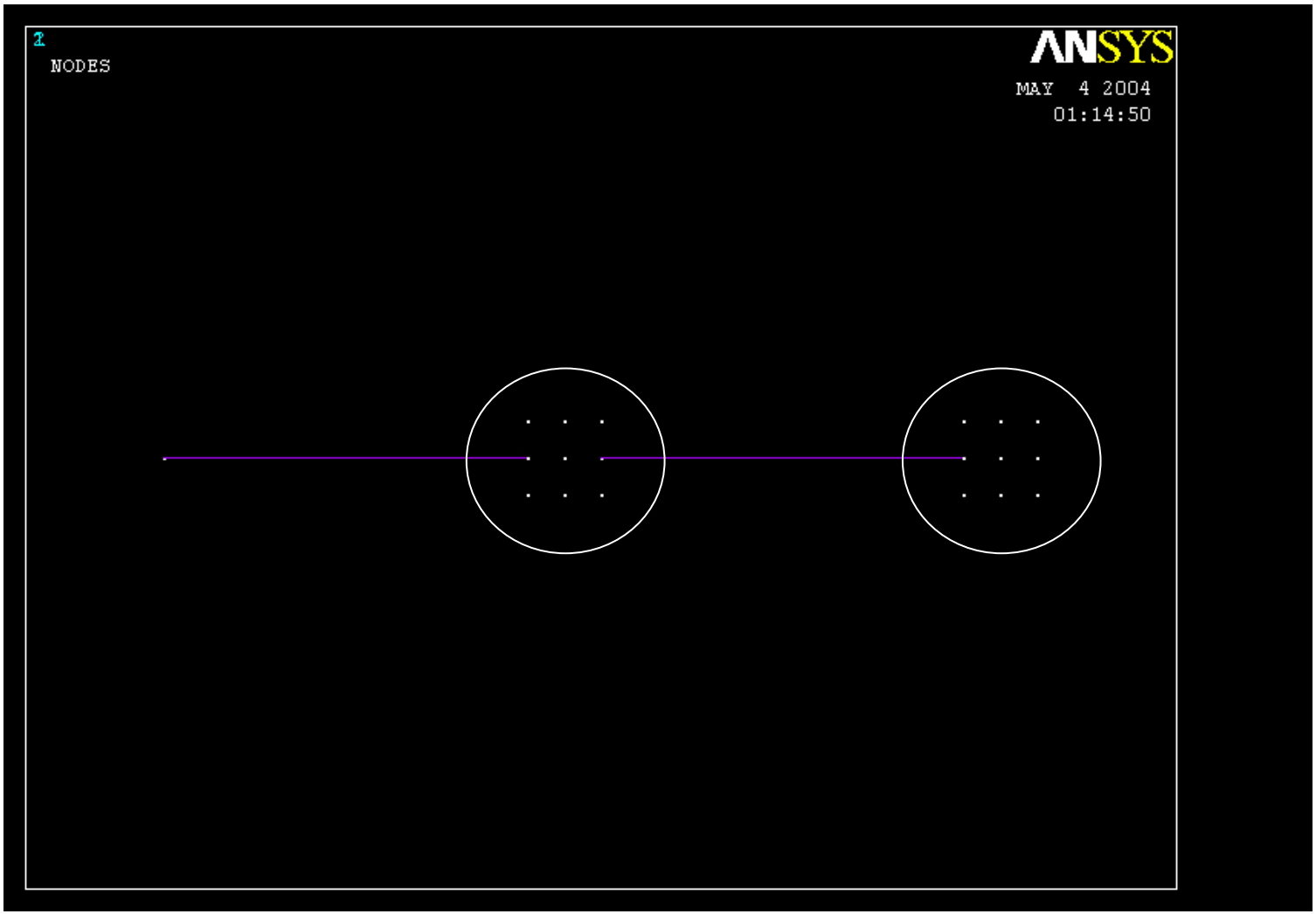


Example – Define Loads

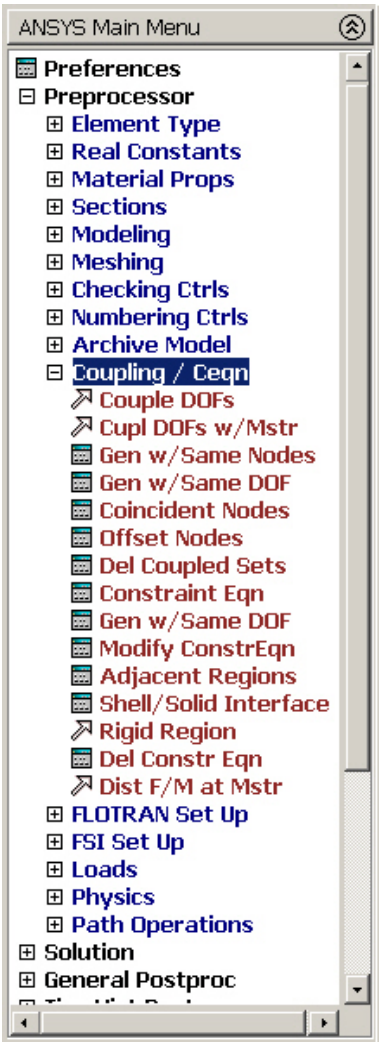
Solution > Define Loads > Apply > Structural > Displacement > On Nodes

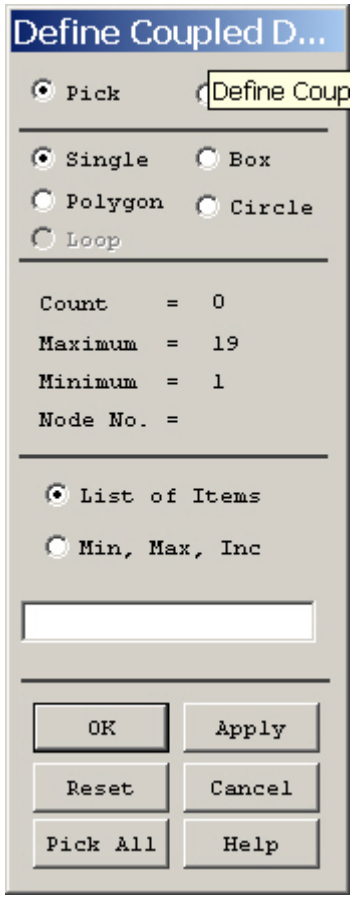


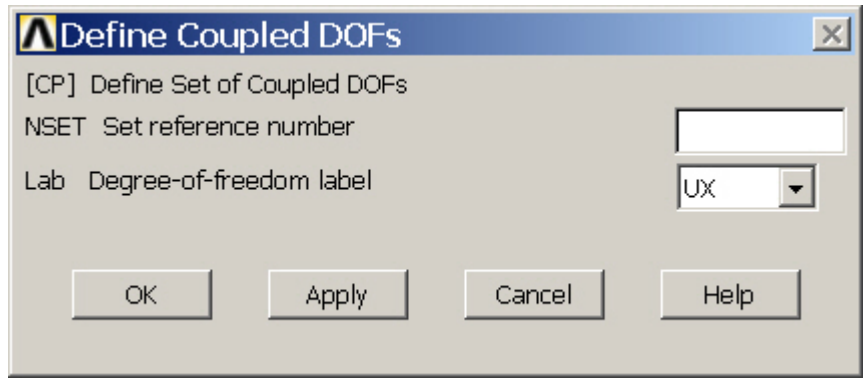
Example – Define Loads



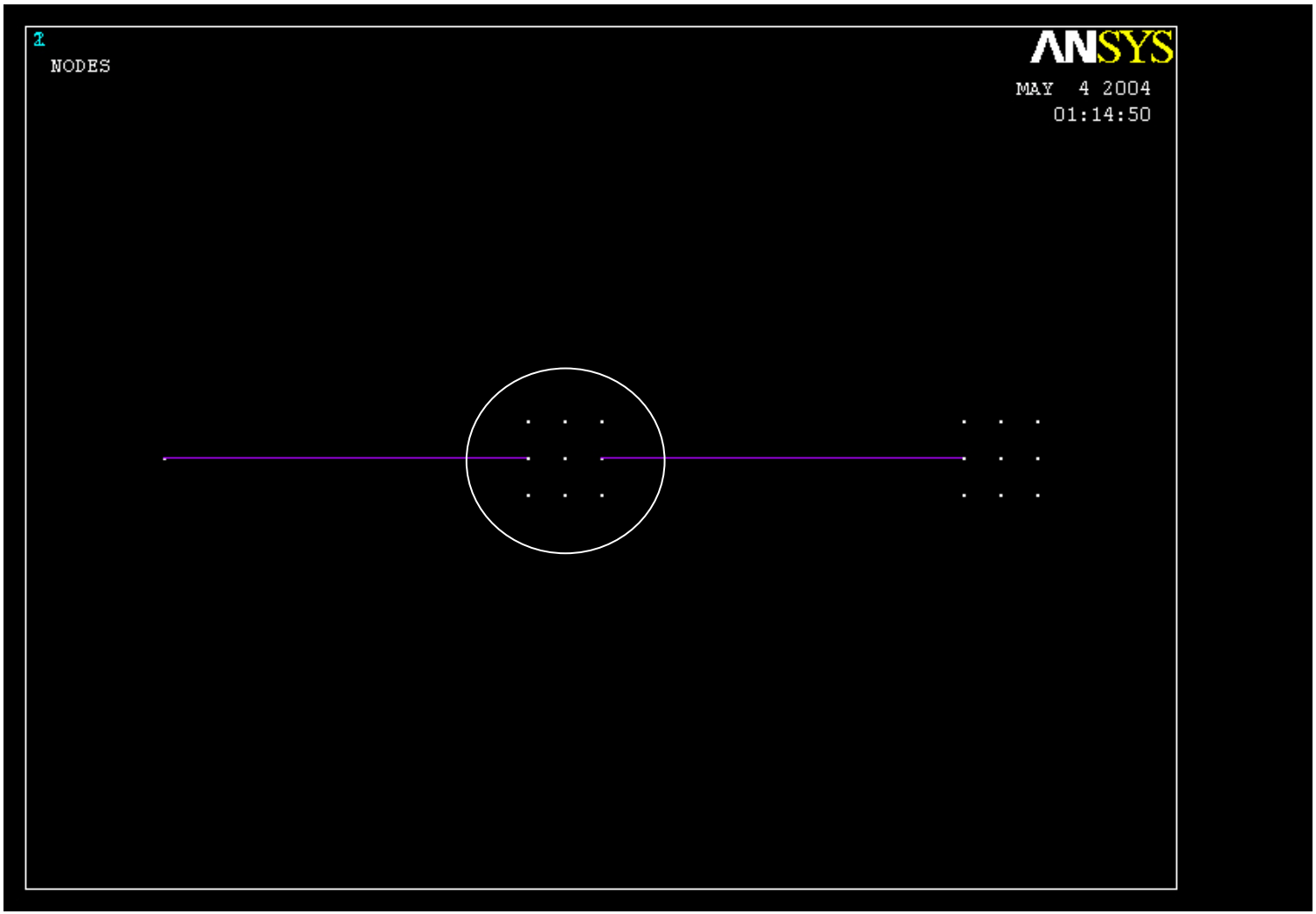
Example – Coupling DOFs



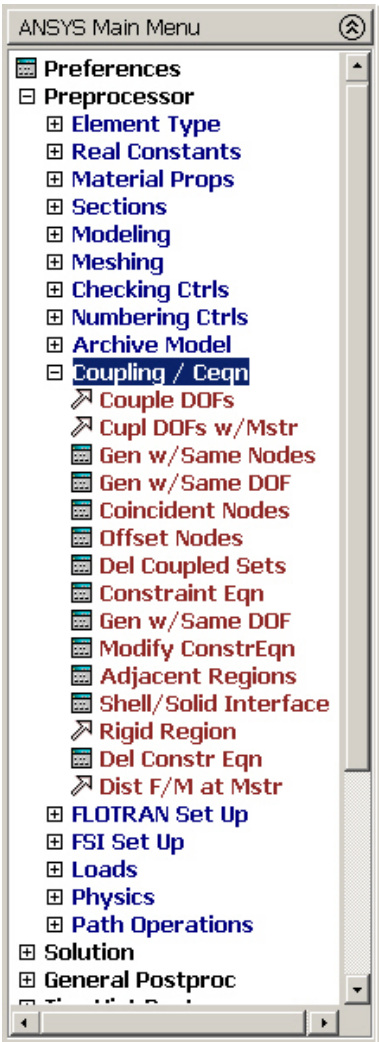


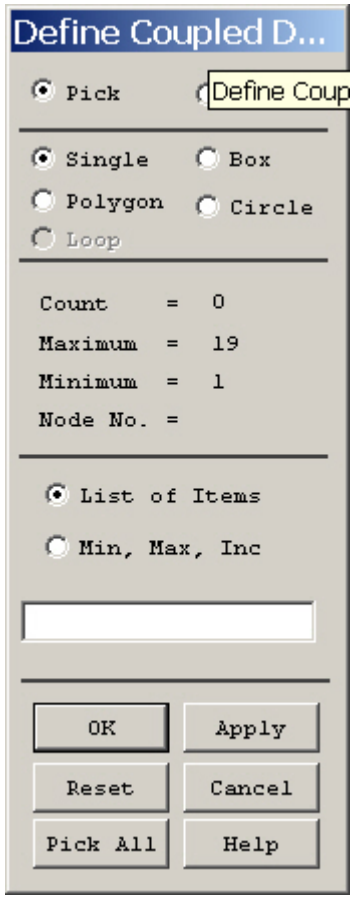


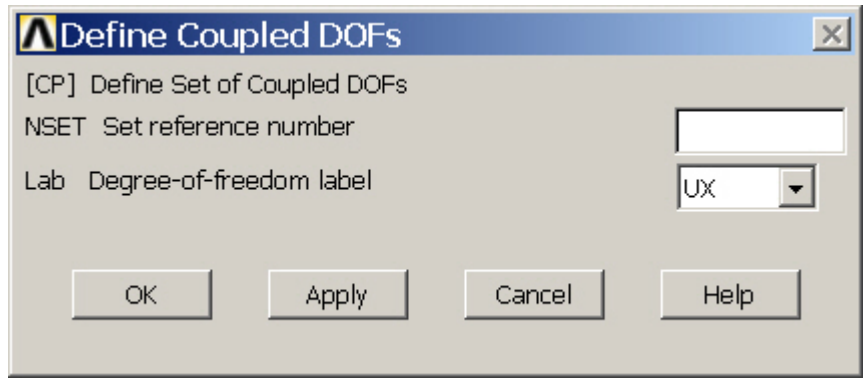
Example – Coupling DOFs



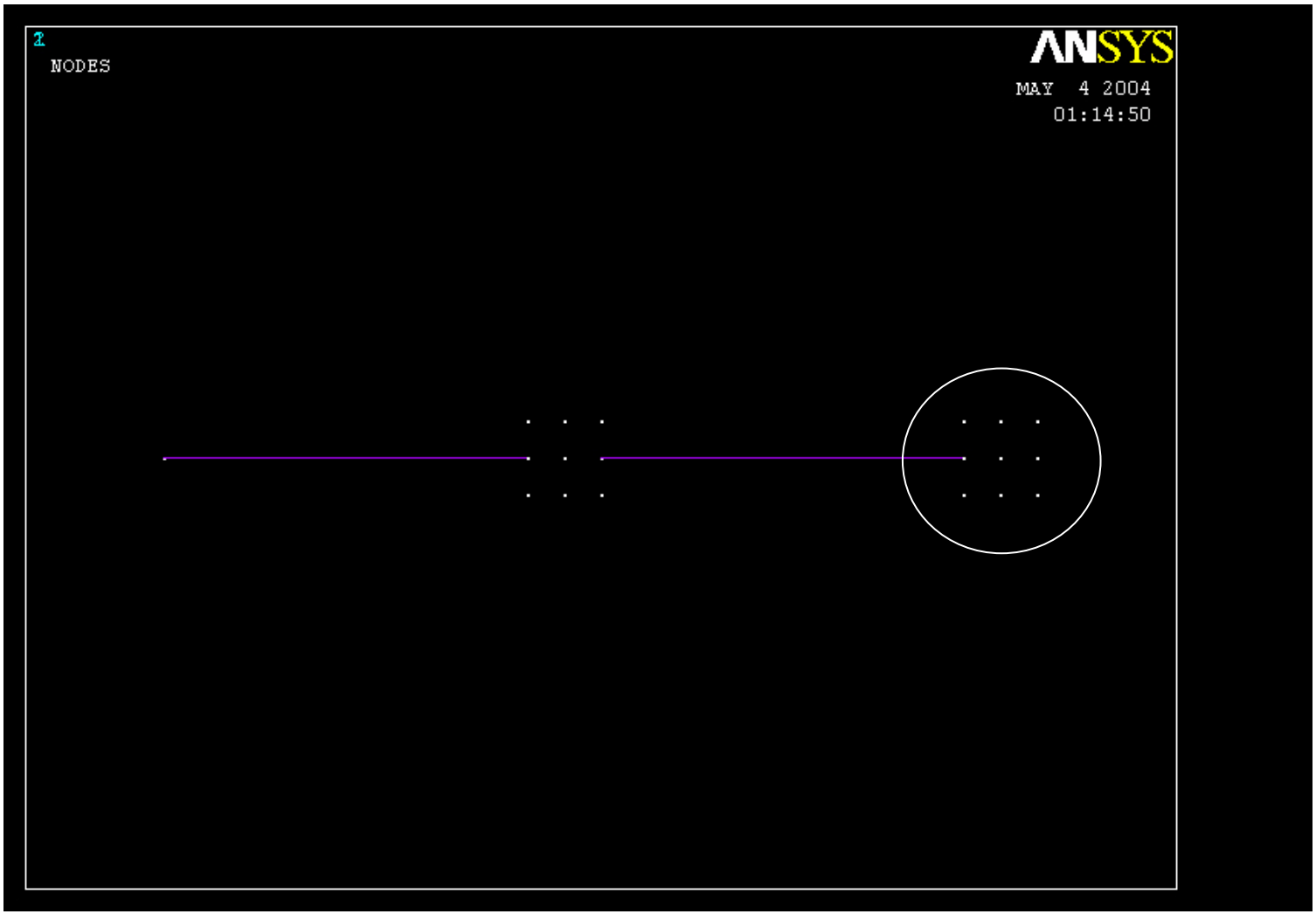
Example – Coupling DOFs



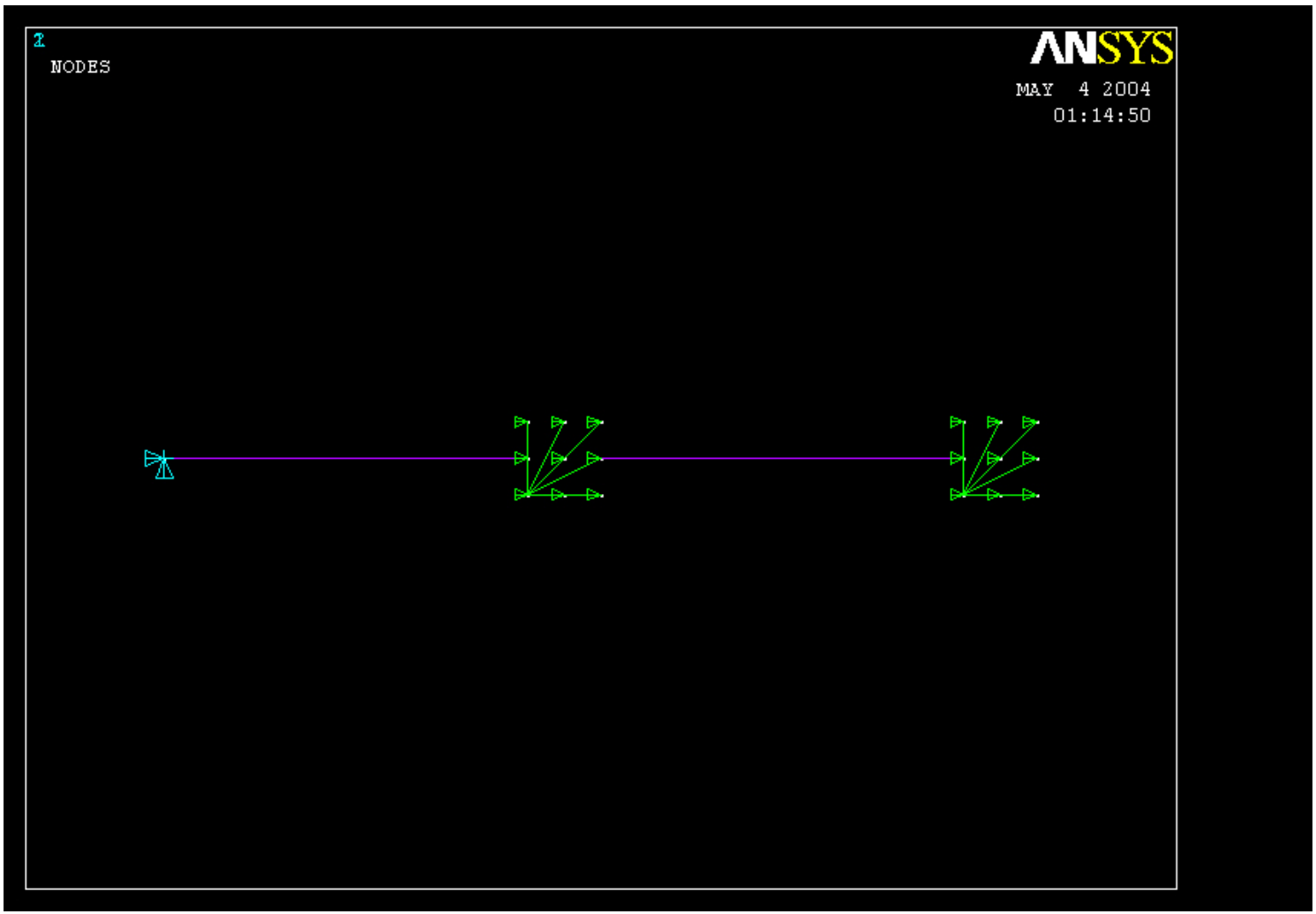




Example – Coupling DOFs

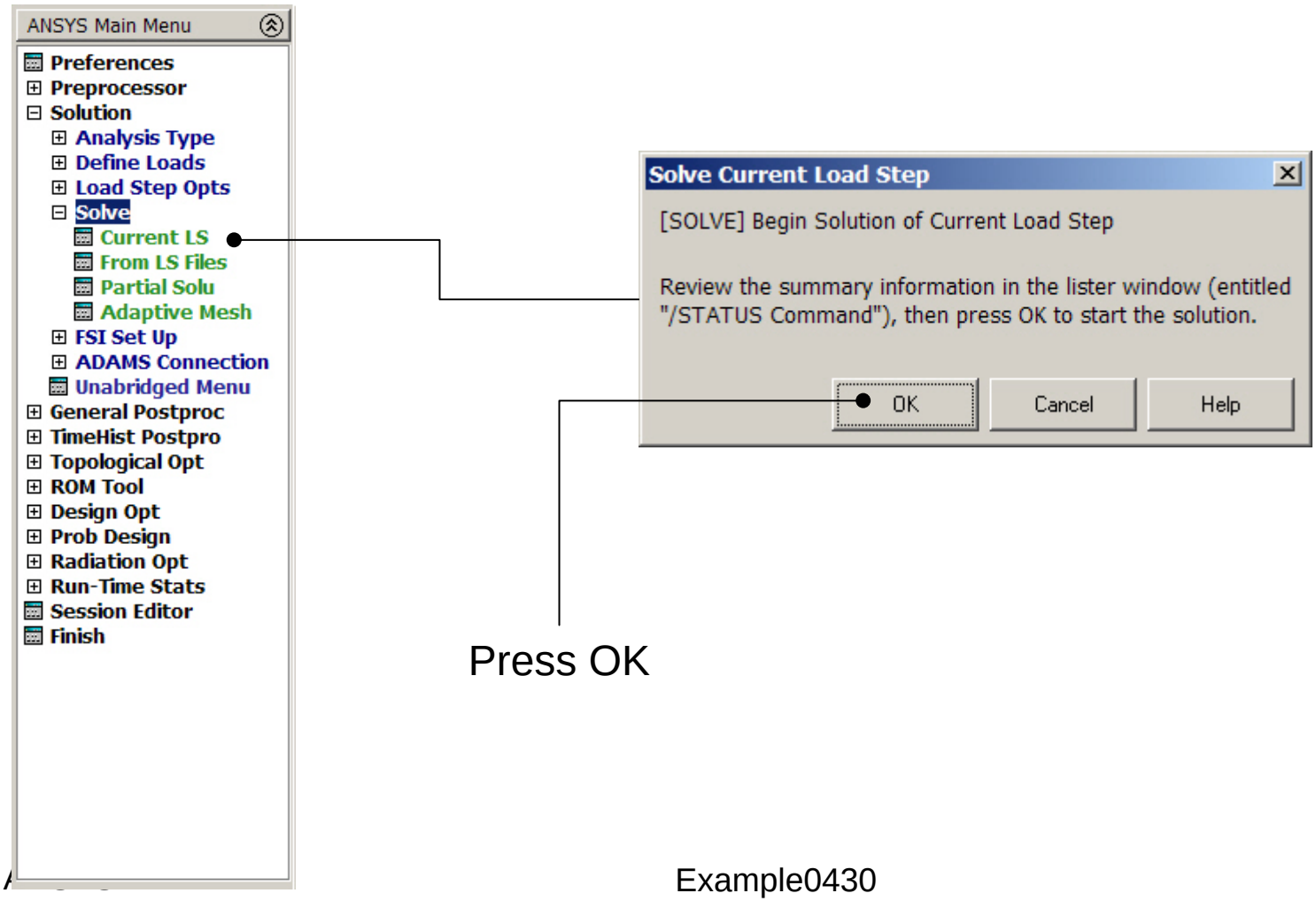


Example – Analysis model



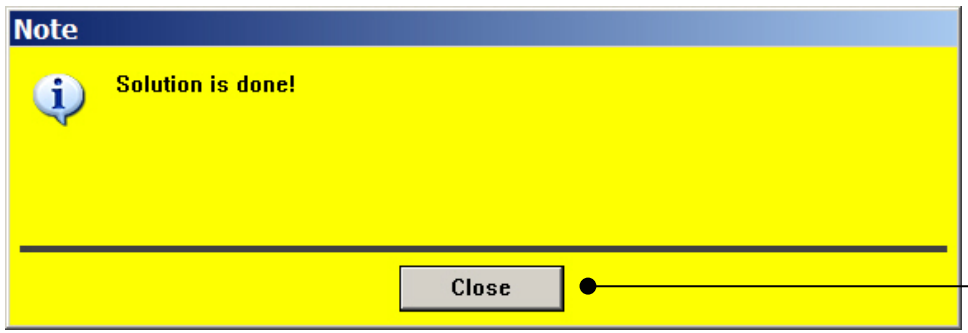
Example - Solve

Solution > Solve > Current LS



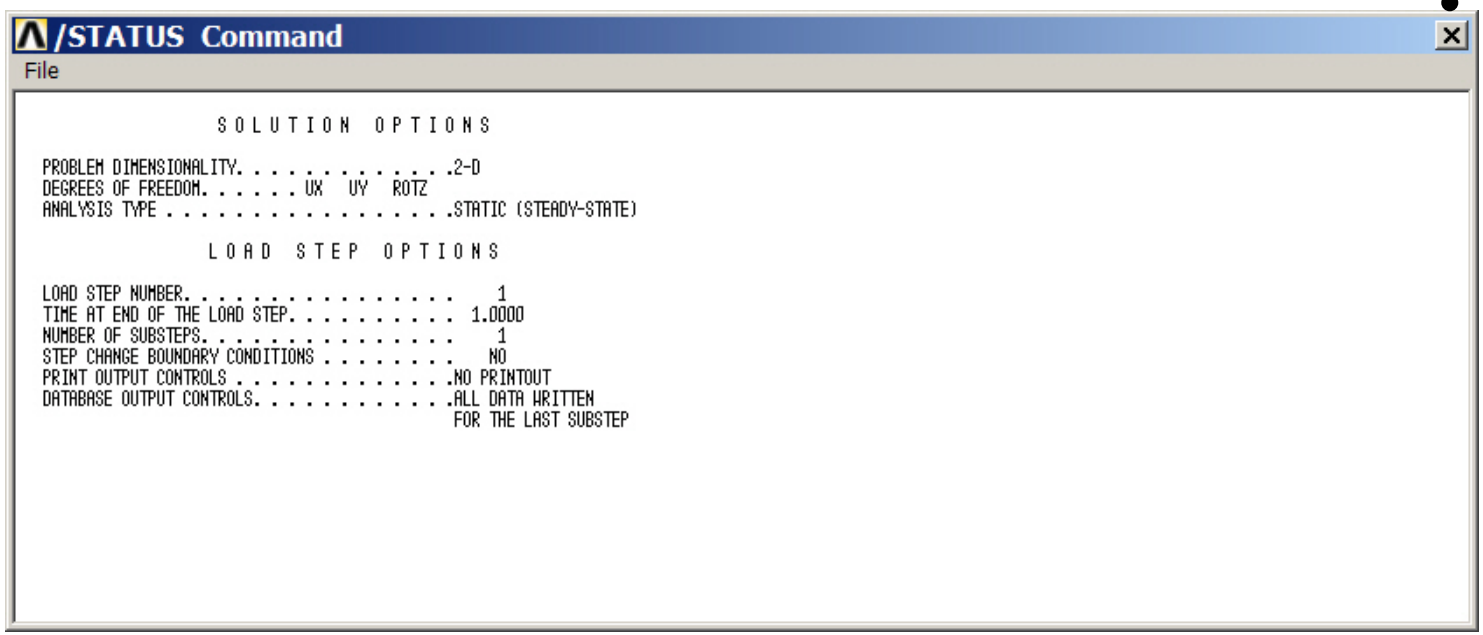
Press OK

Example - Solve

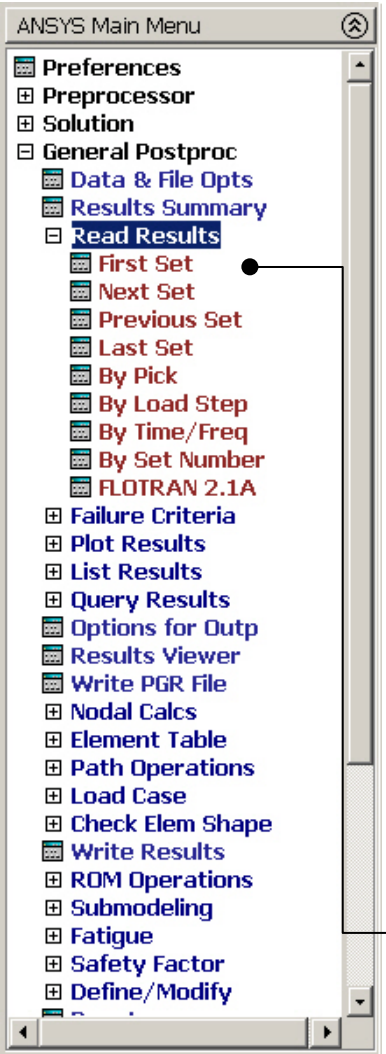


Press Close

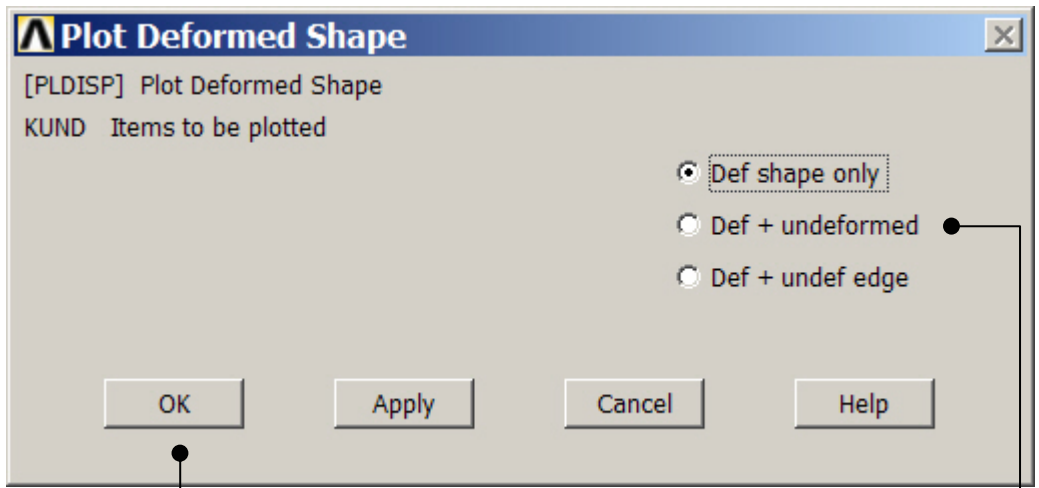
Press here
to Close



Example – Read Results



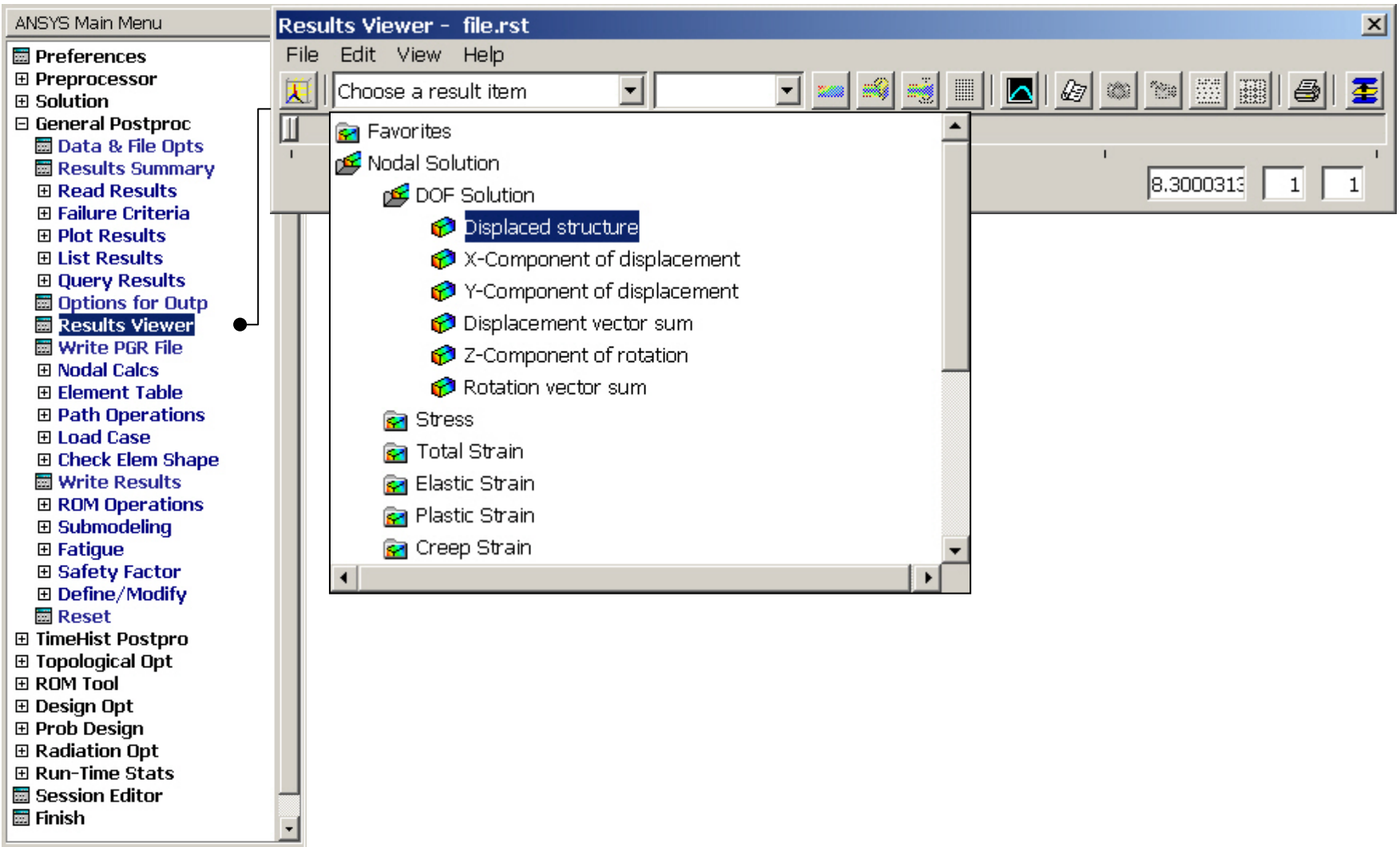
General Postproc > Plot Results > Deformed Shape



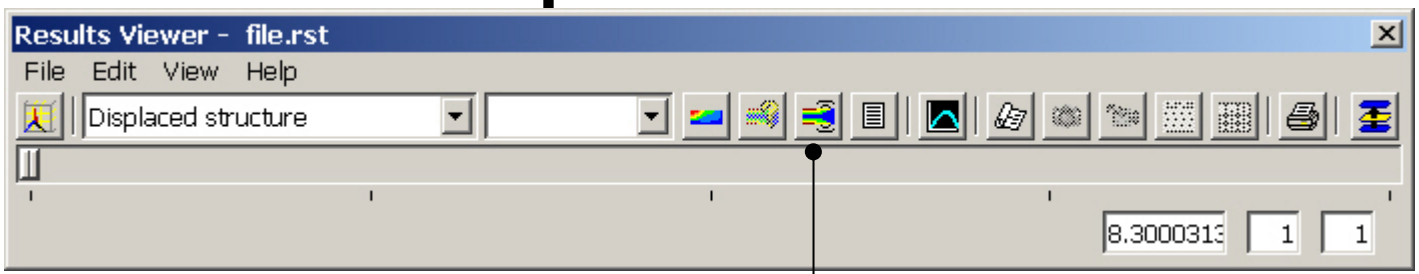
Select “Def+undeformed” and Press OK

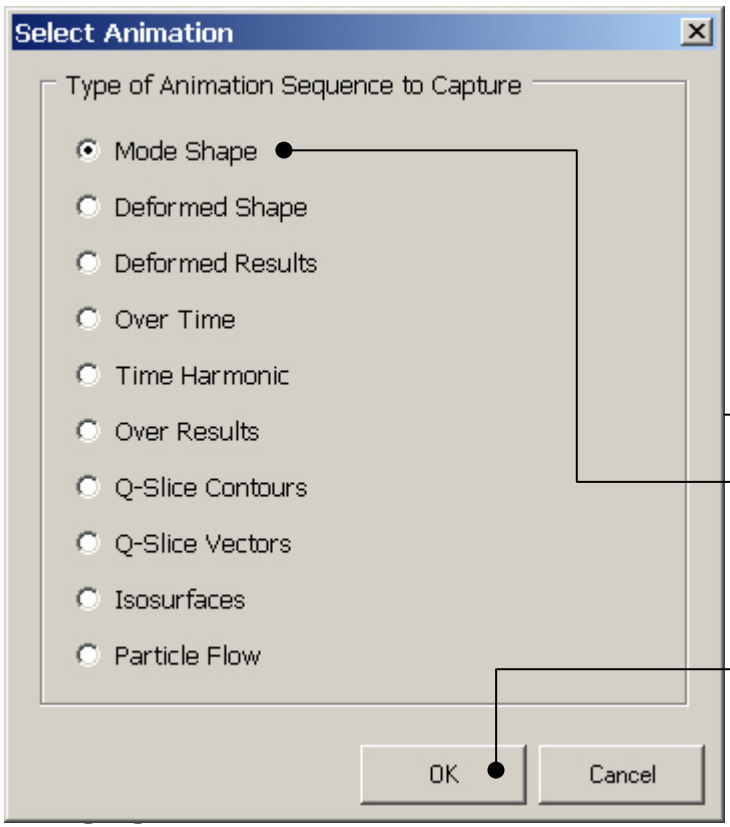
Read first set

Example – Result viewer



Example – Result viewer



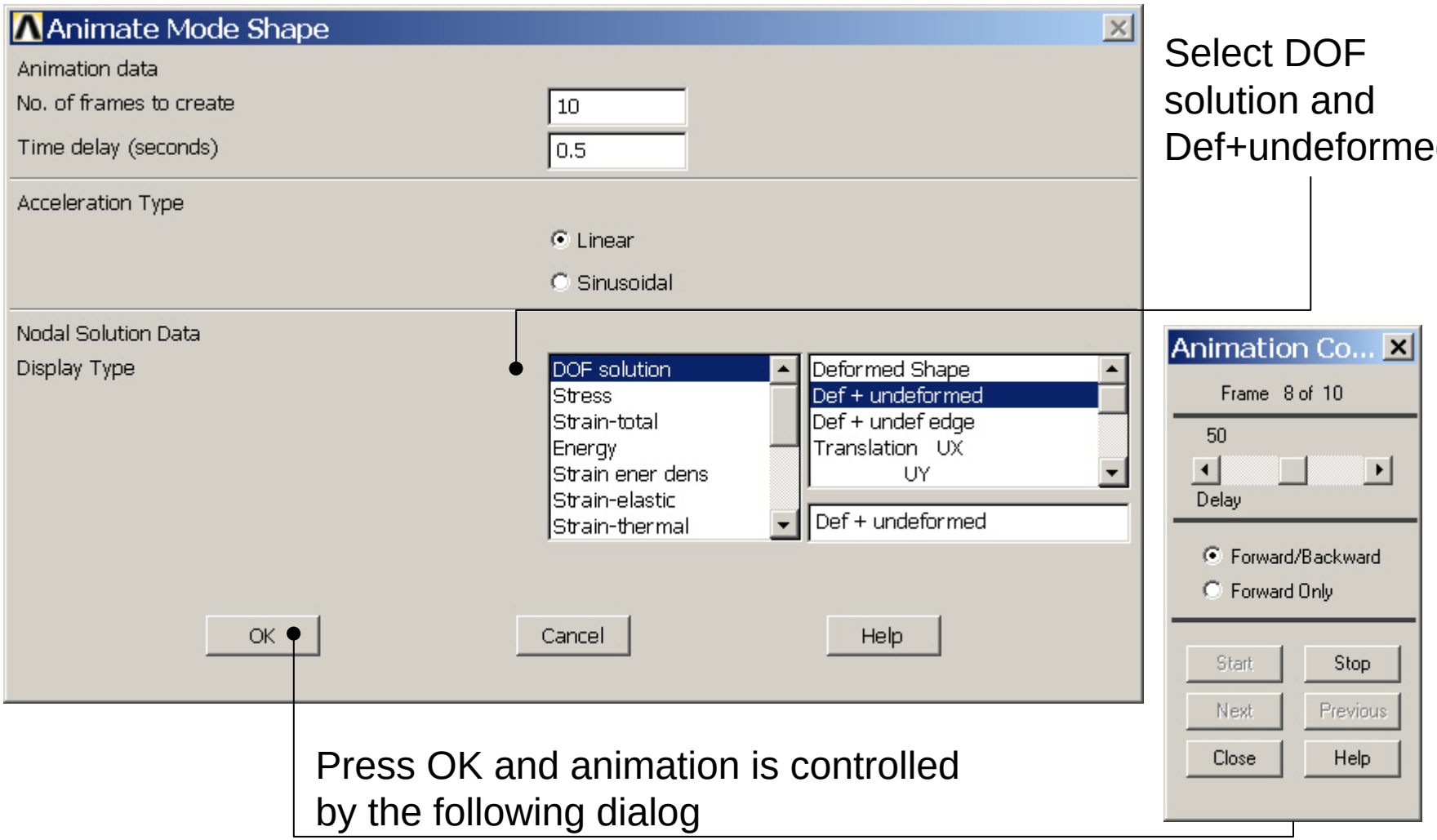


Select mode shape, the last mode read is displayed

Press OK

Example0430

Example – Result viewer



Select DOF solution and Def+undeformed

Press OK and animation is controlled by the following dialog

Example – Report generator

Modal analysis