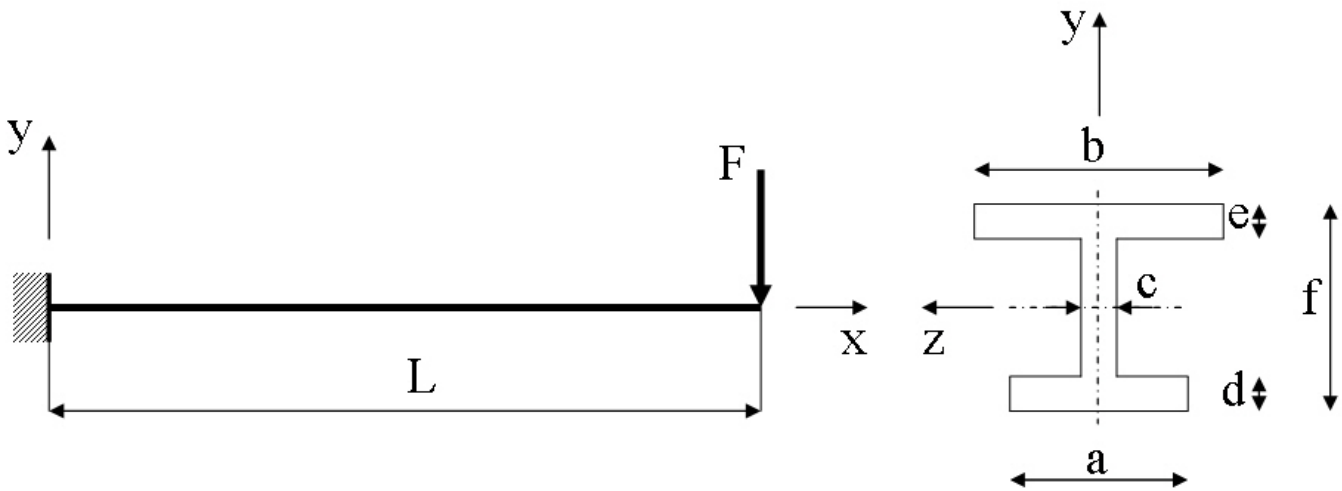
Course in ANSYS

Example0120

Example – Cantilever beam



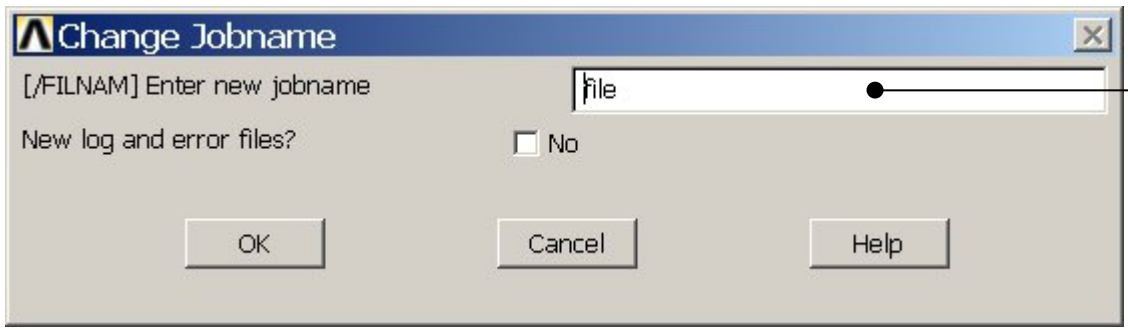
Objective:
Compute the maximum deflection
Tasks:
Create a table and compare results with results obtained from beam theory?
Display the deflection figure?
Topics:
Topics: Start of analysis, Element type, Real constants, Material, modeling, element size for beam models, saving/restoring

$E = 210000 N/mm^2$
$\nu = 0.3$
L = 5000mm
a = 250mm
b = 450mm
c = 10mm
d = 20mm
e = 15mm
f = 350mm
F = 100N

Example - title

Utility Menu > File > Change Jobname — GUI

/jobname, Example0120 — Command line entry

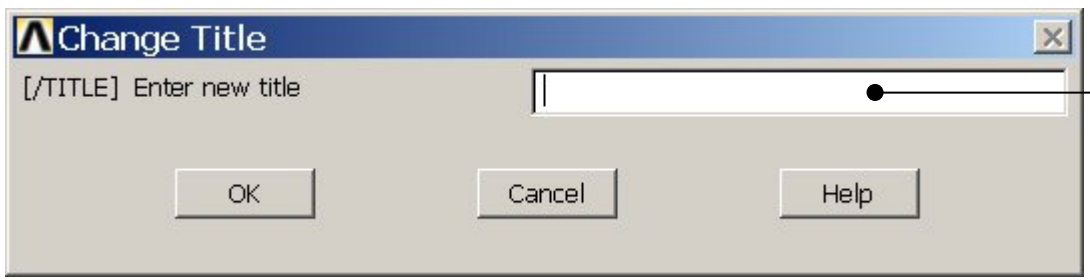


Enter: Example0120

Utility Menu > File > Change Title

/title, Cantilever beam

Enter: Cantilever beam



Example - Keypoints

Note: An empty # result in automatic numbering.

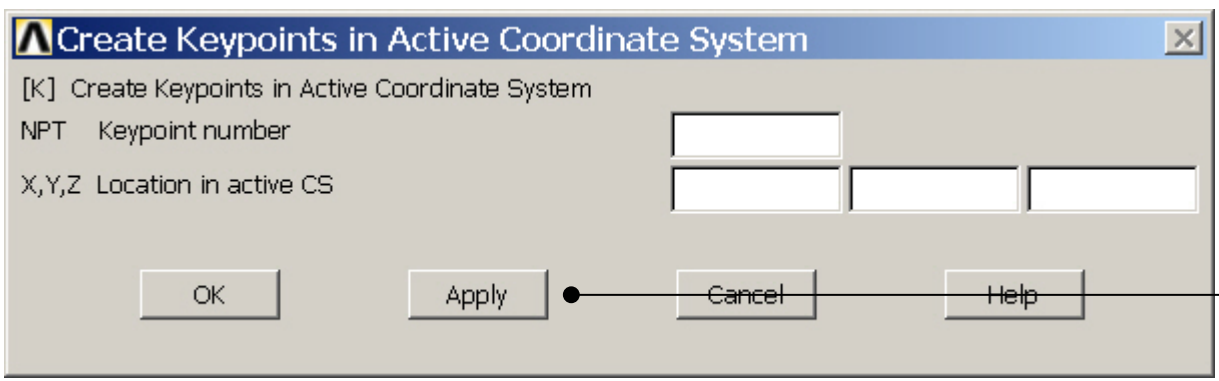
Preprocessor > Modeling > Create > Keypoints > In Active CS

/PREP7
K,,,,
K,,5000,,
K,,,50,

General format:
K,#,X,Y,Z

Keypoint number
X Keypoint x-coordinate
Y Keypoint y-coordinate
Z Keypoint z-coordinate

Enter 0,0,0 and
Press **Apply**
Enter 5000,0,0 and
Press **Apply**
Enter 0,50,0 and
Press **Apply**

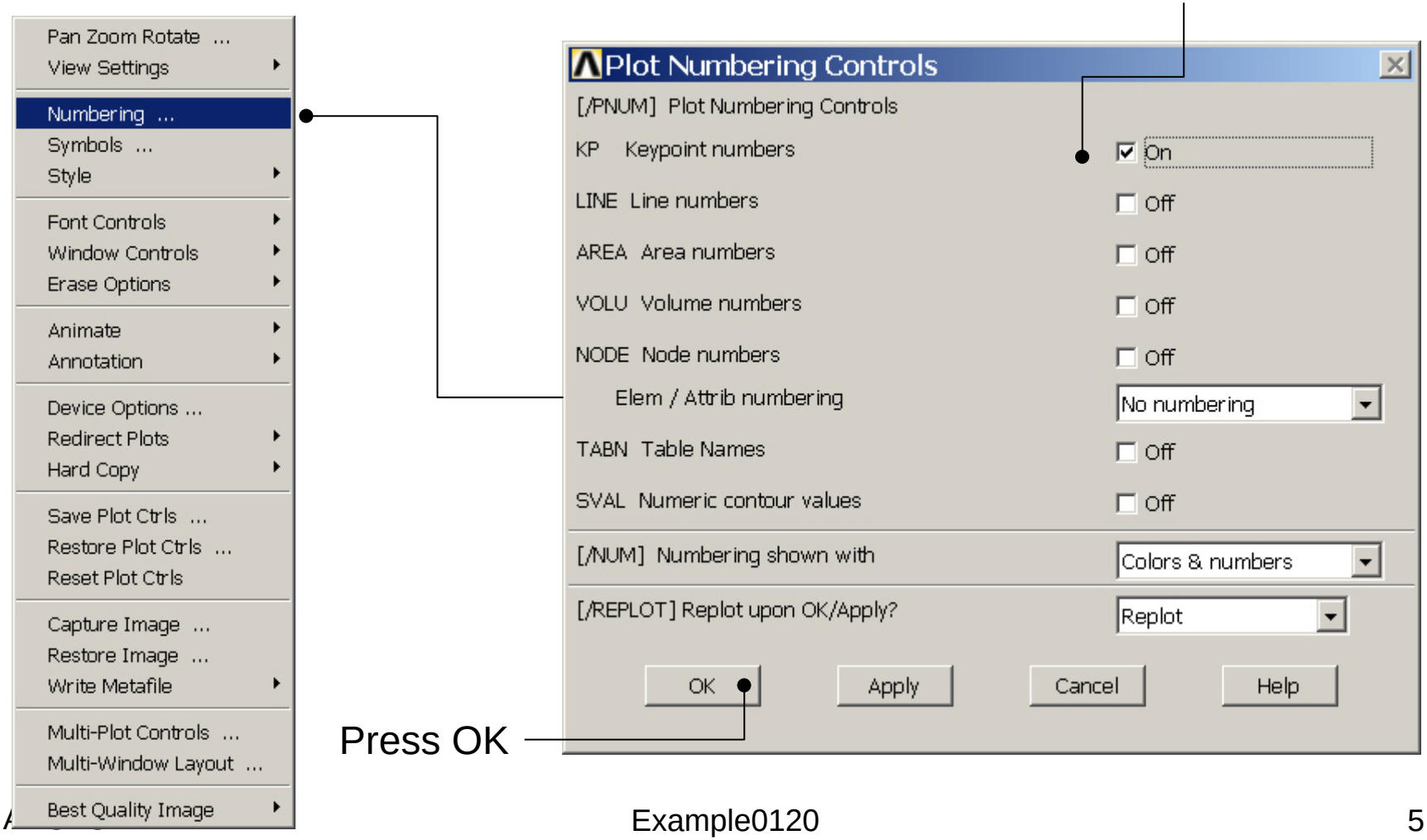


Note: An empty box result in a zero. It is allowed to enter 0.0 in each box.

Example - Numbering

Utility Menu > PlotCtrls > Numbering

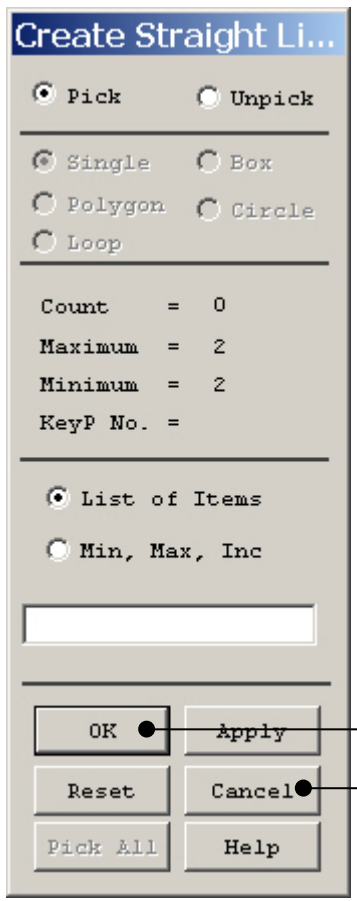
Switch on Keypoint numbers



Press OK

Example - Lines

Preprocessor > Modeling > Create > Lines > Lines > Straight Line
Create a line between Keypoint 1 and Keypoint 2.
L,1,2



HINT: By clicking with the right-hand mouse button you shift between the Pick/Unpick function. This is indicated by the direction of the cursor arrow:

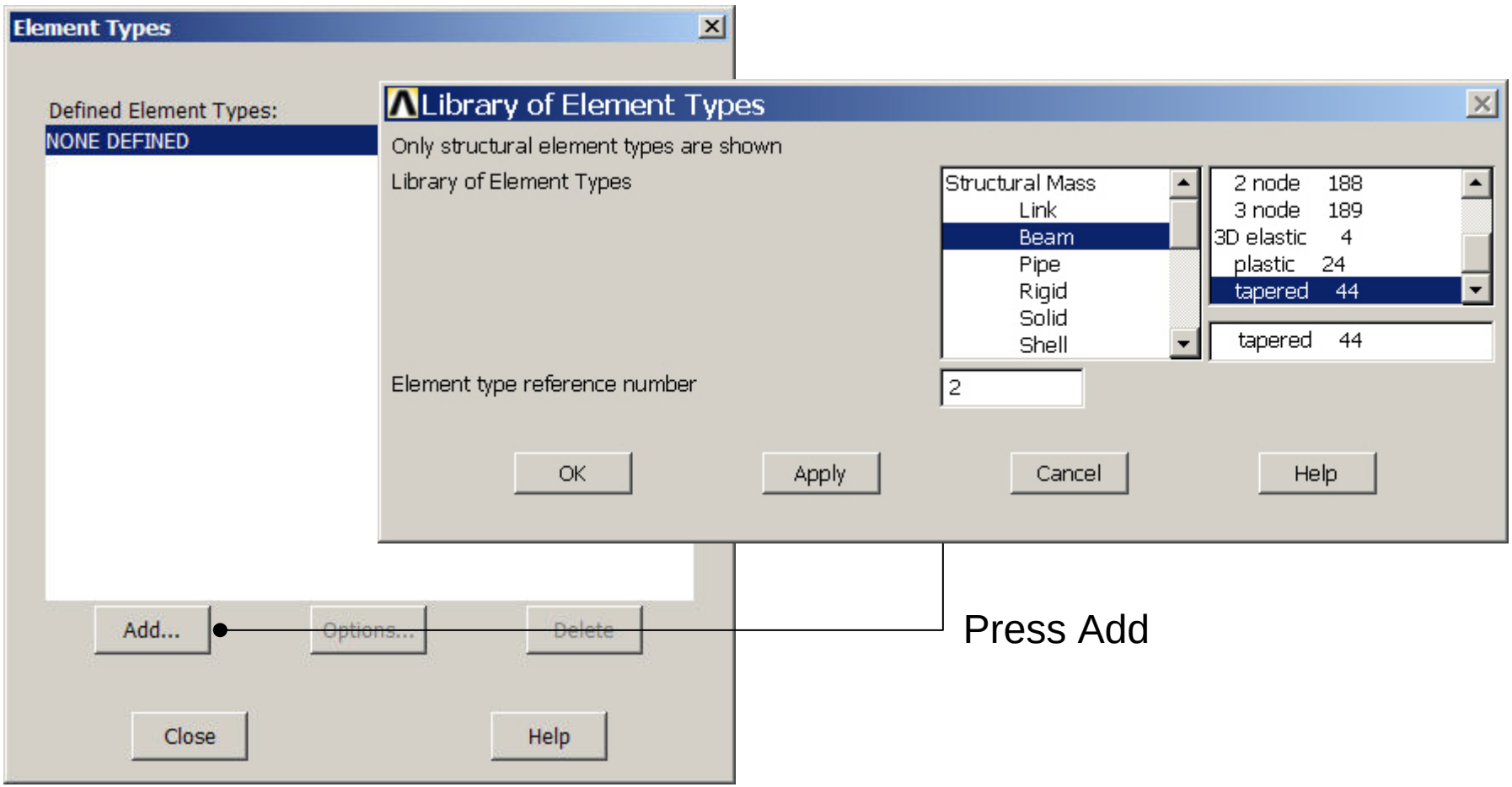
Pick: upward arrow

Unpick: downward arrow

Press OK or Cancel to finish selection

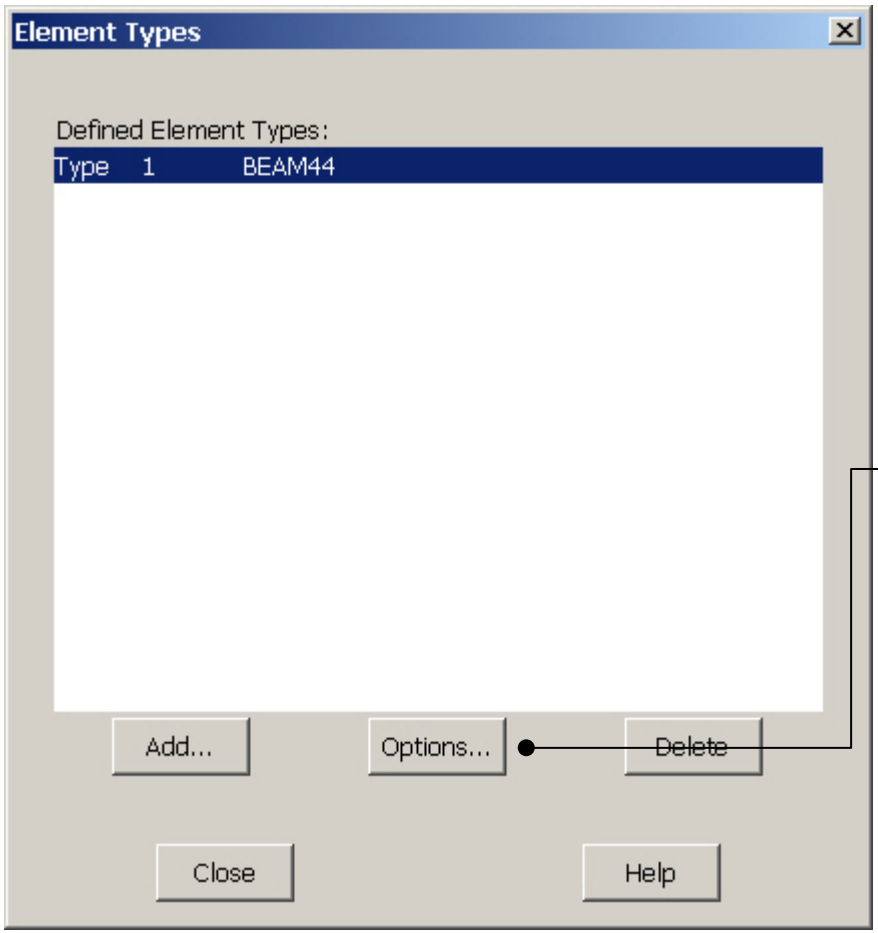
Example – Element Type

Preprocessor > Element Type > Add/Edit/Delete



Example - Element Type

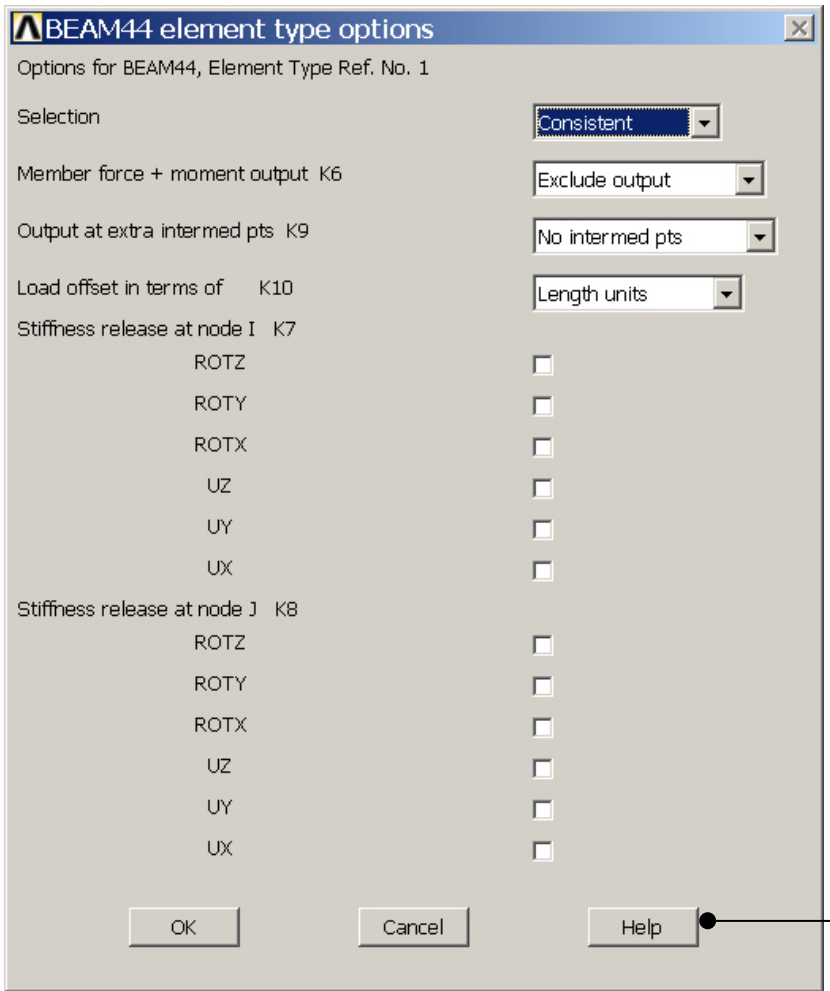
Preprocessor > Element Type > Add/Edit/Delete



Press Options

Example - Element Type

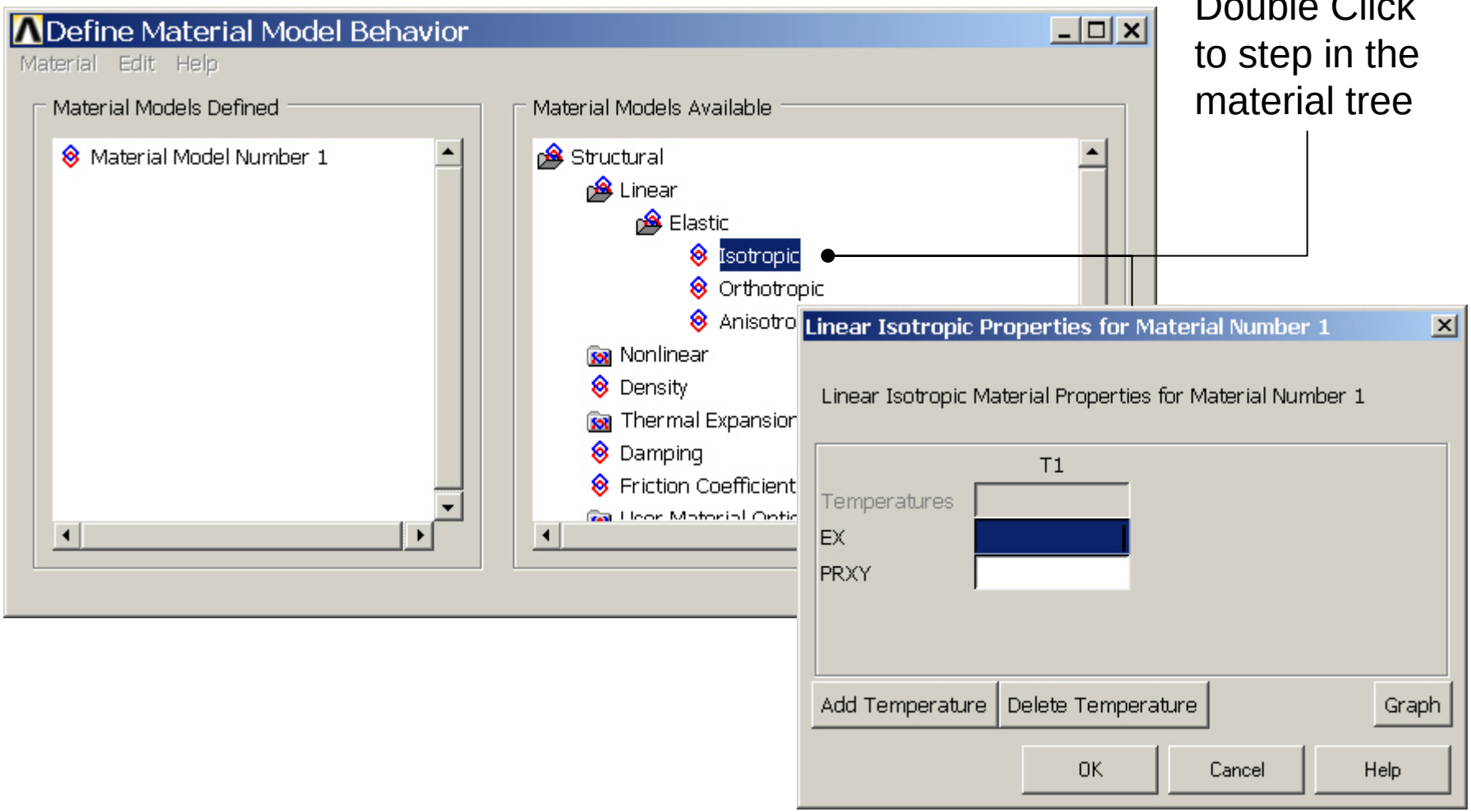
Preprocessor > Element Type > Add/Edit/Delete



Press Help to learn more about the element.

Example - Material Properties

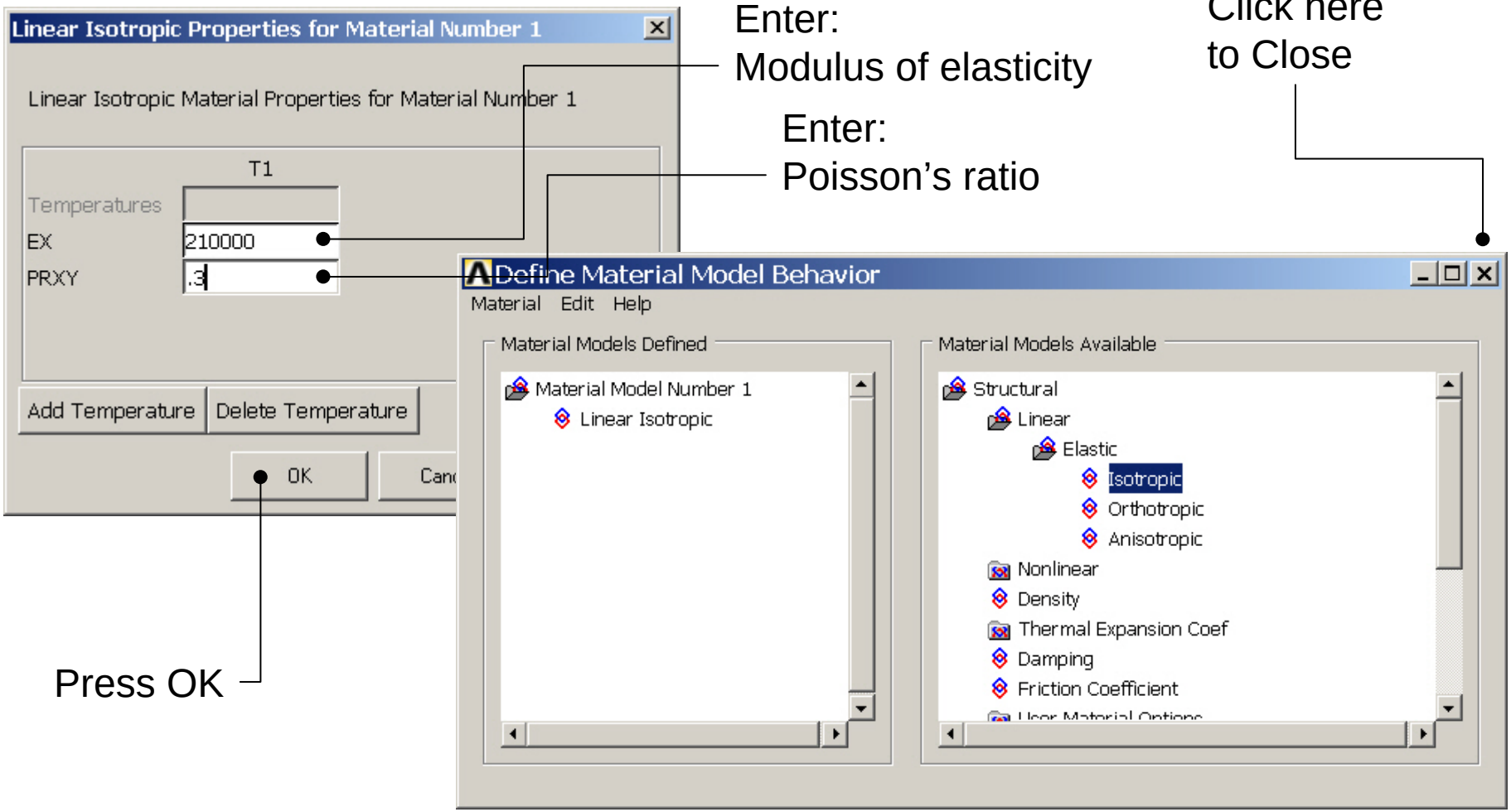
Preprocessor > Material Props > Material Models



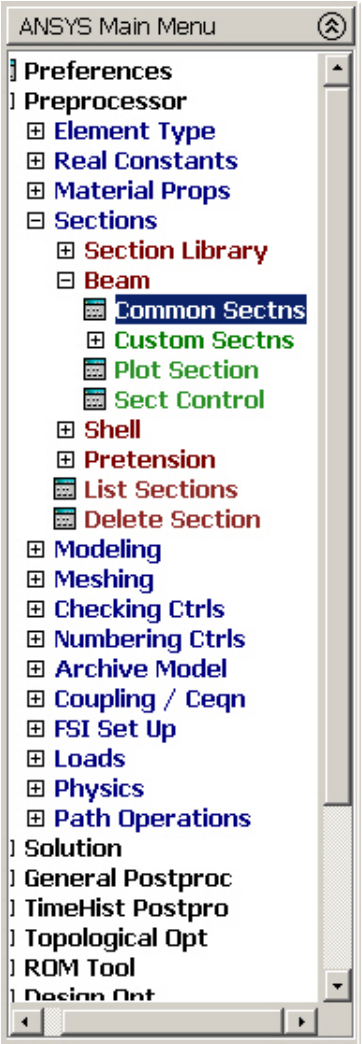
Double Click to step in the material tree

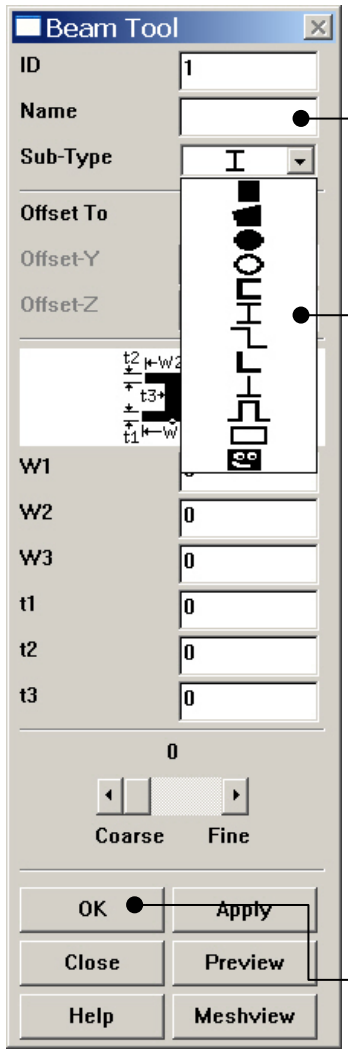
Example - Material Properties

Preprocessor > Material Props > Material Models



Example - Section



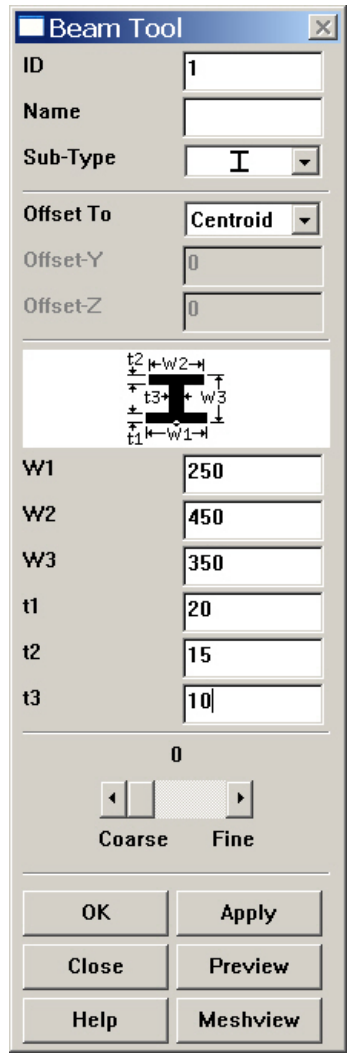


Enter i253

Select the I profile

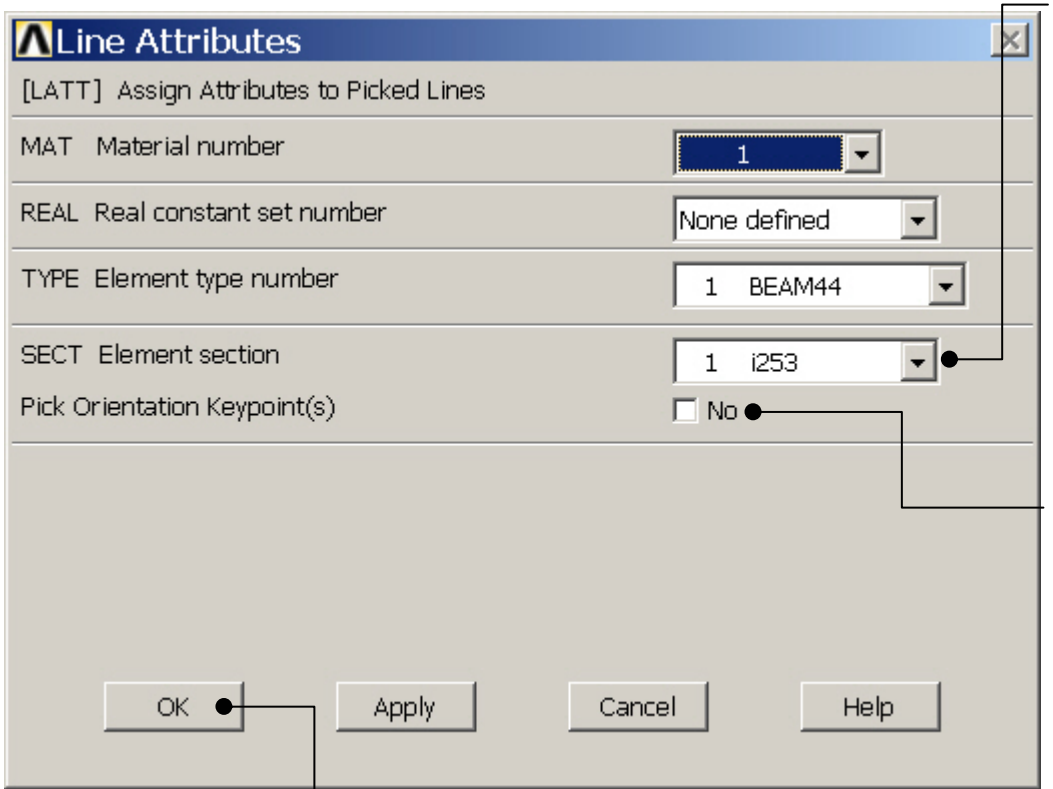
Follow the guidelines at Enter the appropiate cross-sectional data

Press OK to finish



Example – Line Attributes

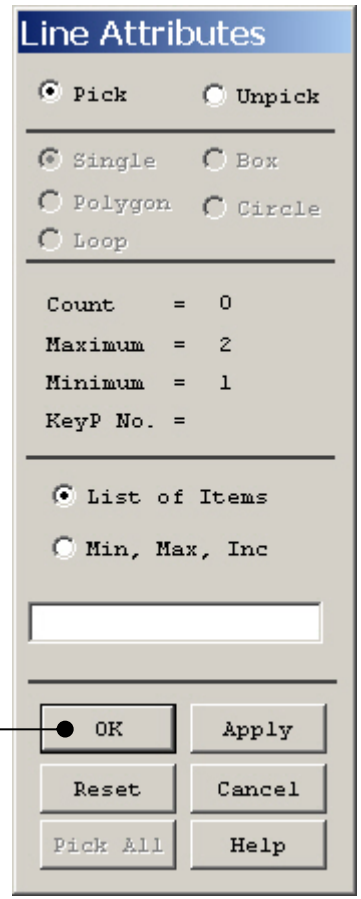
Preprocessor > Meshing > Mesh Attributes > Picked Lines



Select section I253

Change to Yes

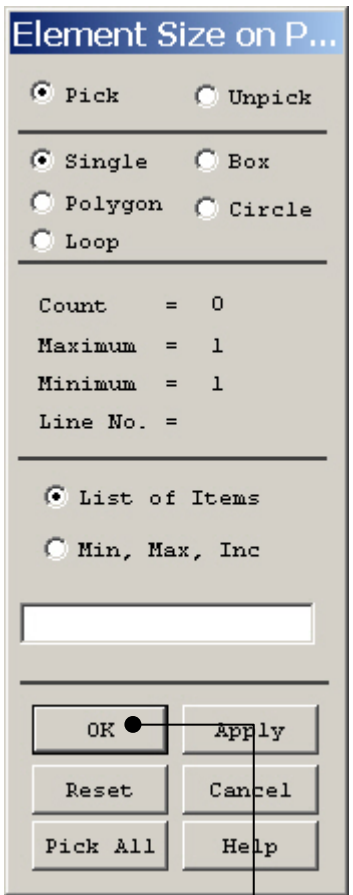
Select KP3

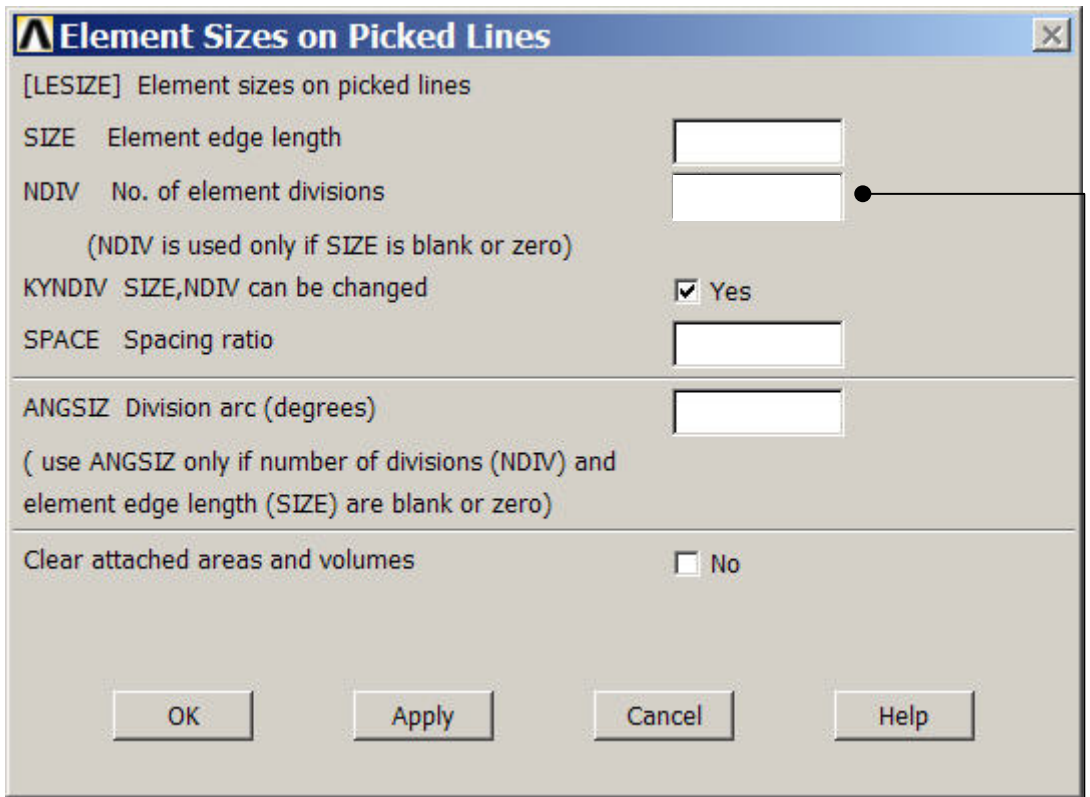


Press OK to finish

Example - Meshing

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





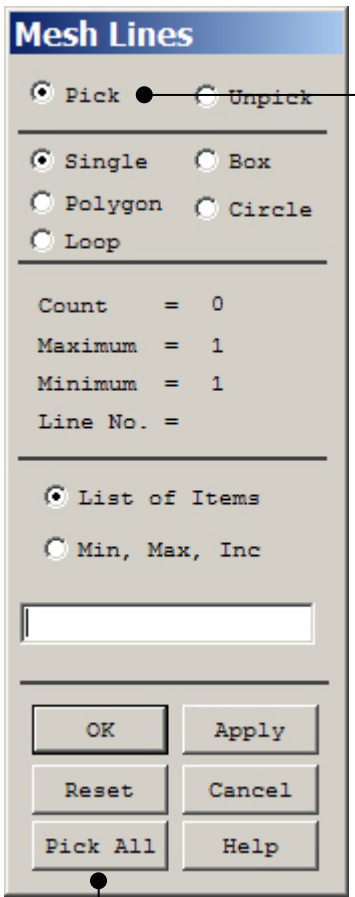
Select/Pick Lines to specify mesh size for

Press OK when finish with selection

Enter 5

Example - Meshing

Preprocessor > Meshing > Mesh > Lines

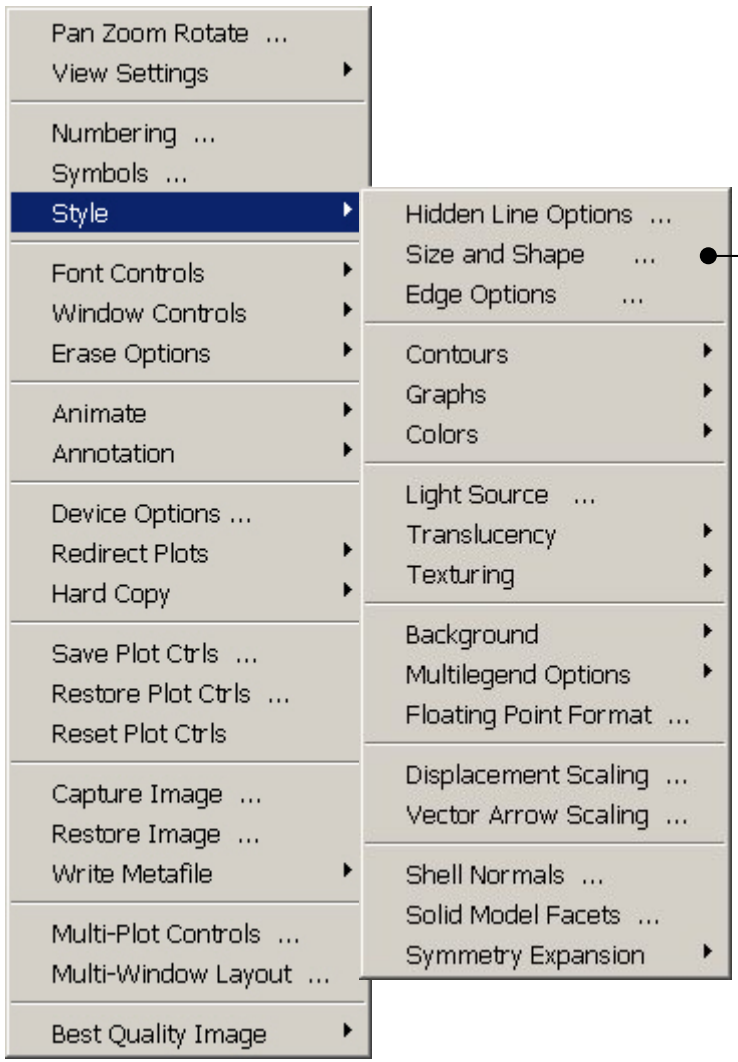


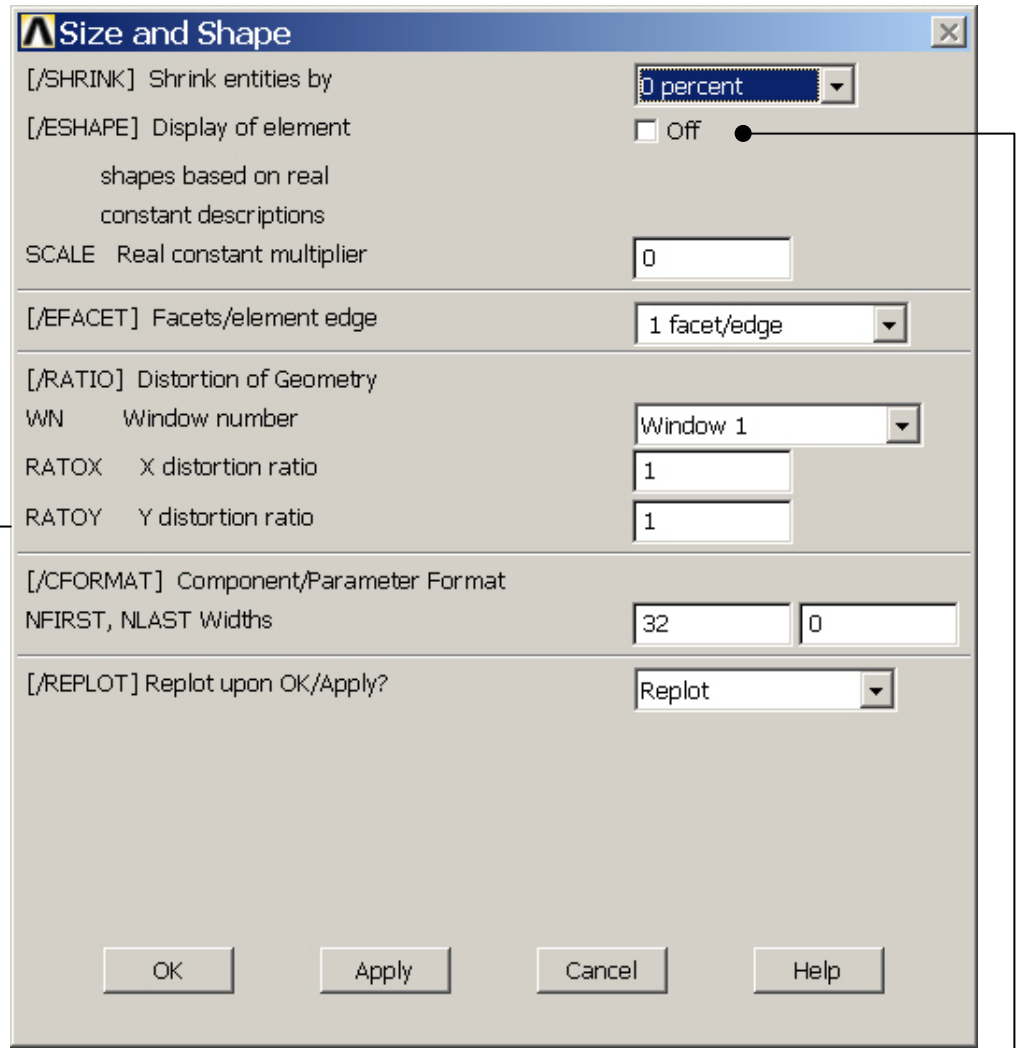
Select individual lines to be meshed by Picking

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

Select all lines defined to be meshed

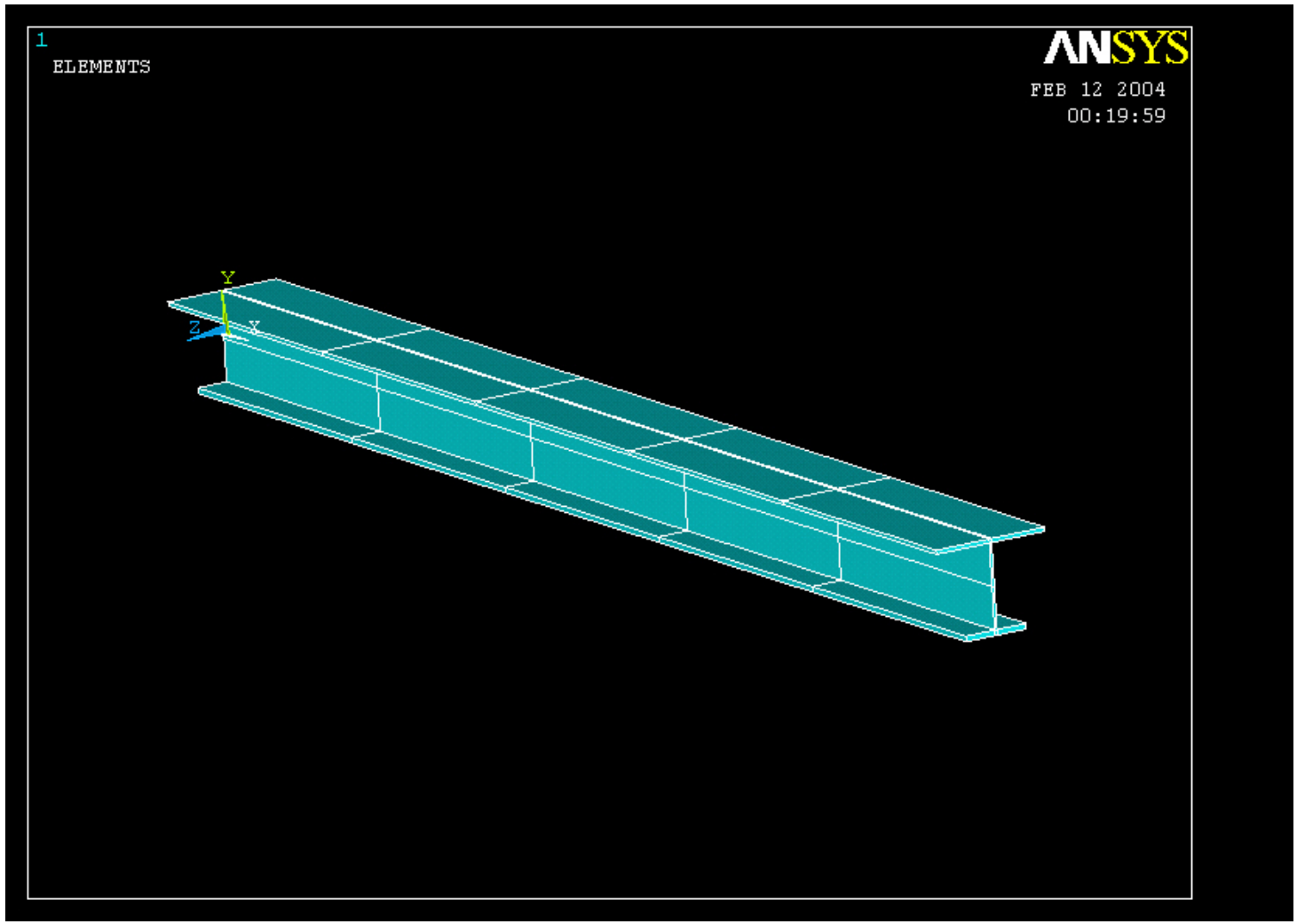
Example - PlotCtrls Menu





Change to On

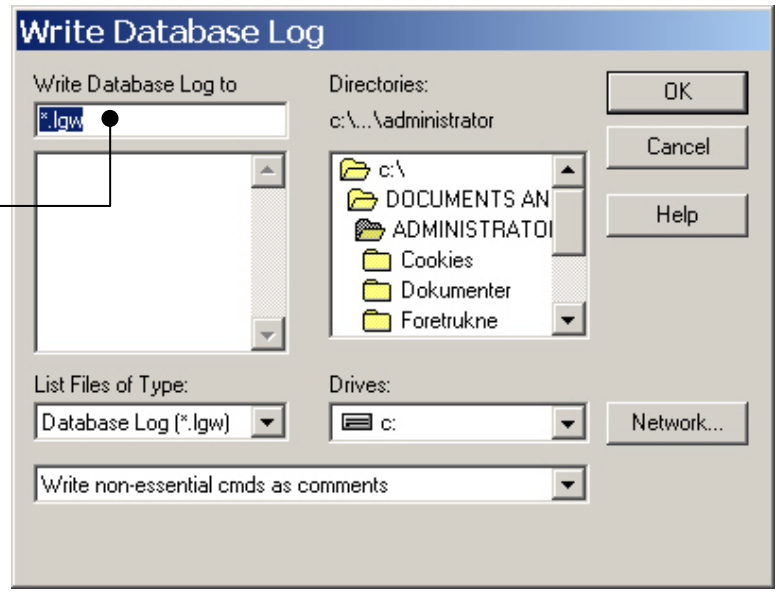
Example – Display of Element



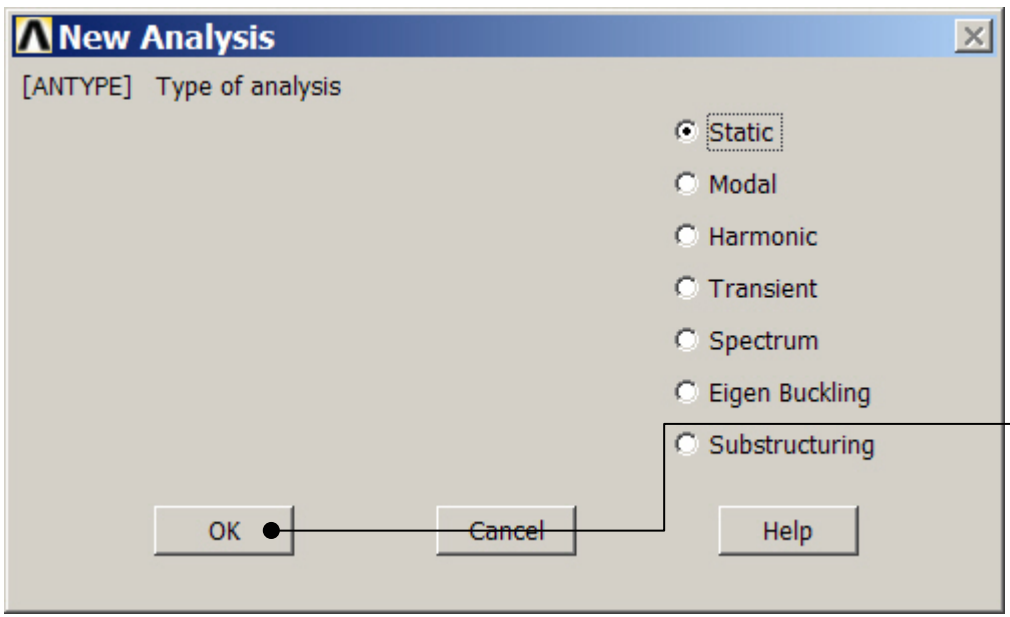
Example – Analysis Type

File > Write DB log file

Enter “example0120.lgw”



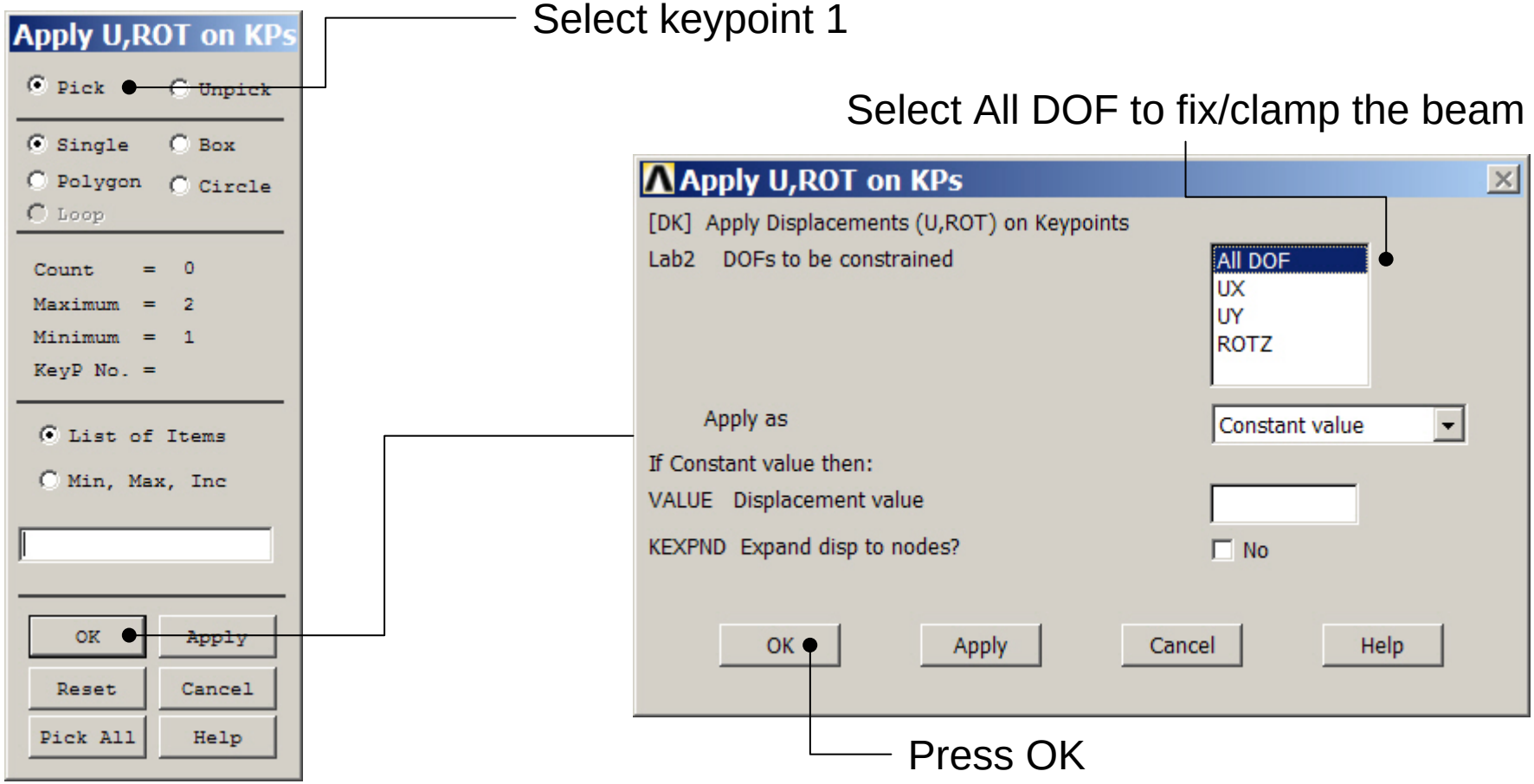
Solution > Analysis Type > New Analysis



Press OK

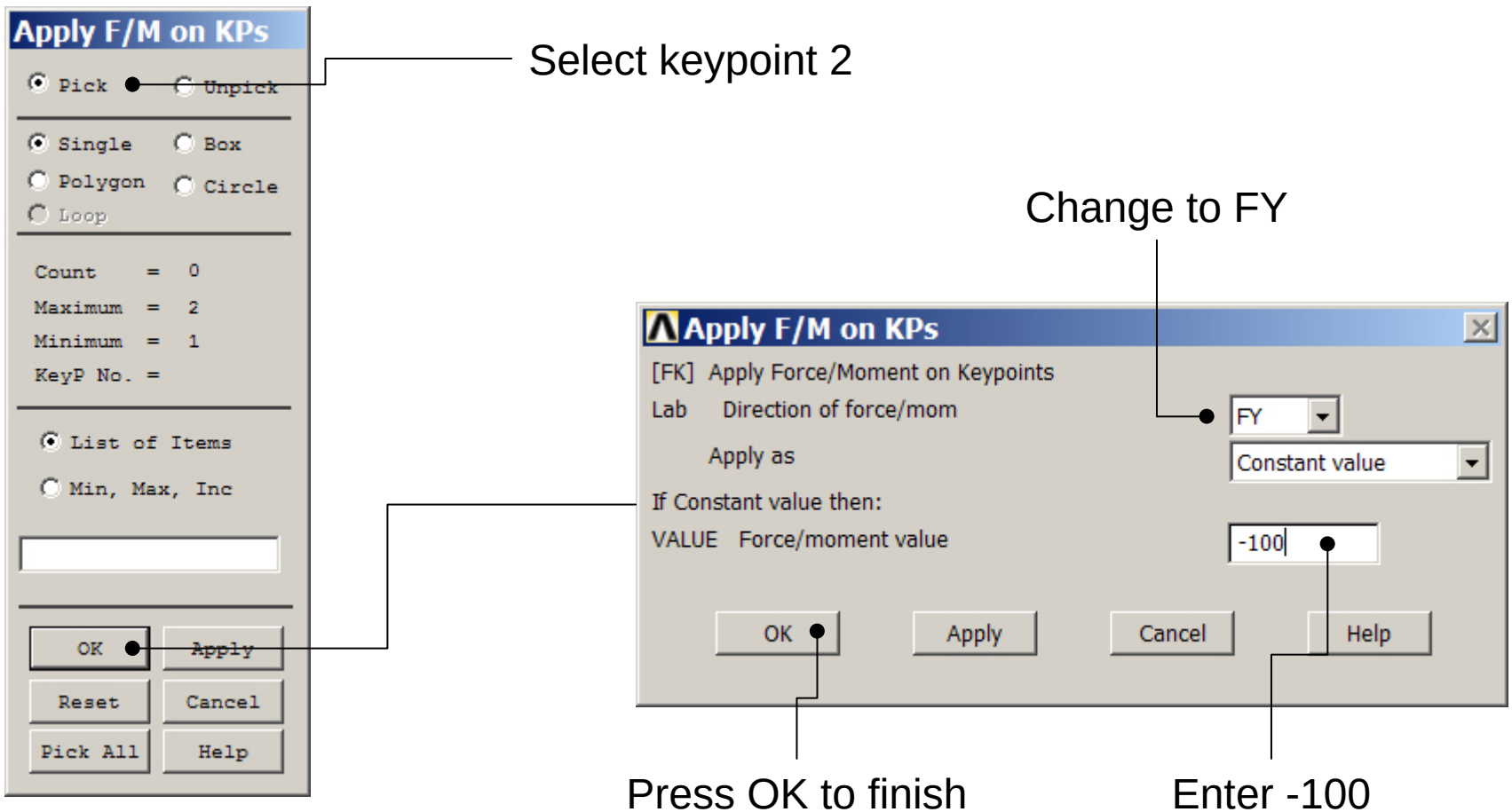
Example – Define Loads

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

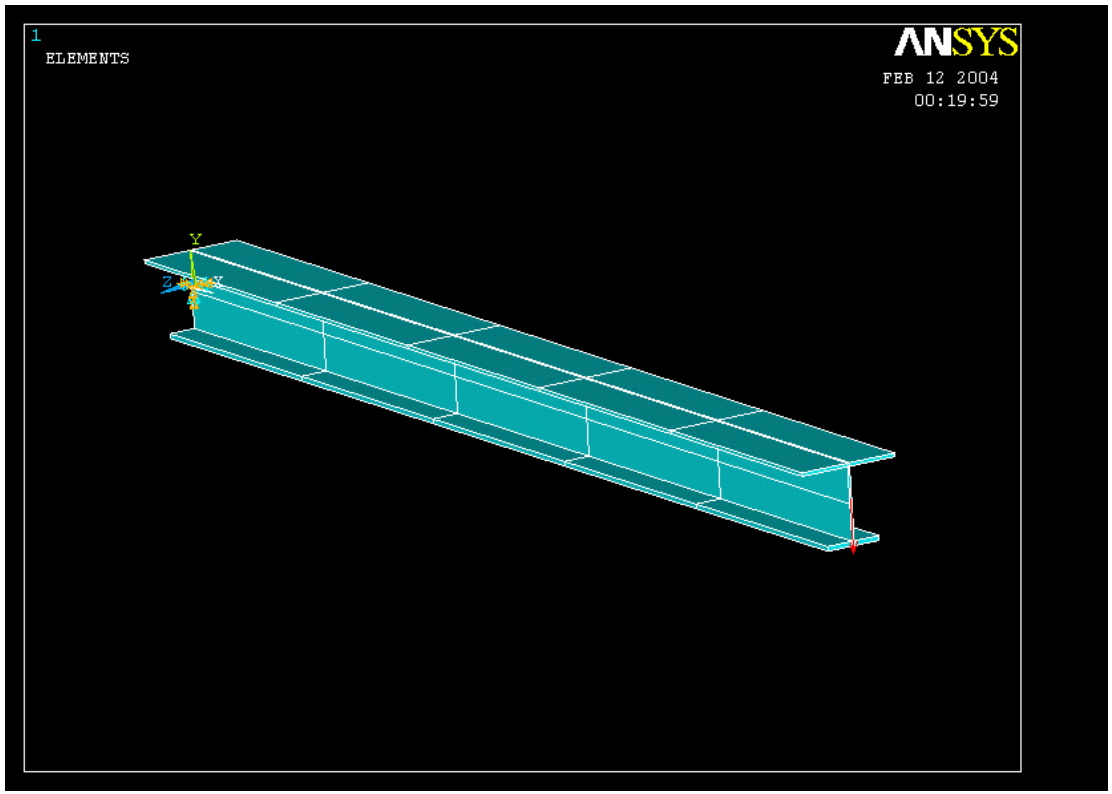


Example – Define Loads

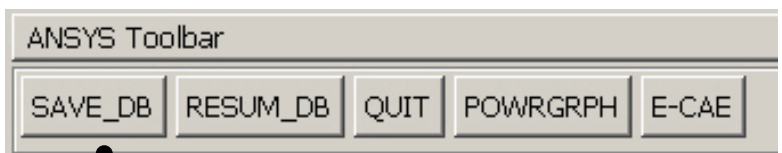
Solution > Define Loads > Apply > Structural > Force/Moment > On Keypoints



Example - Save



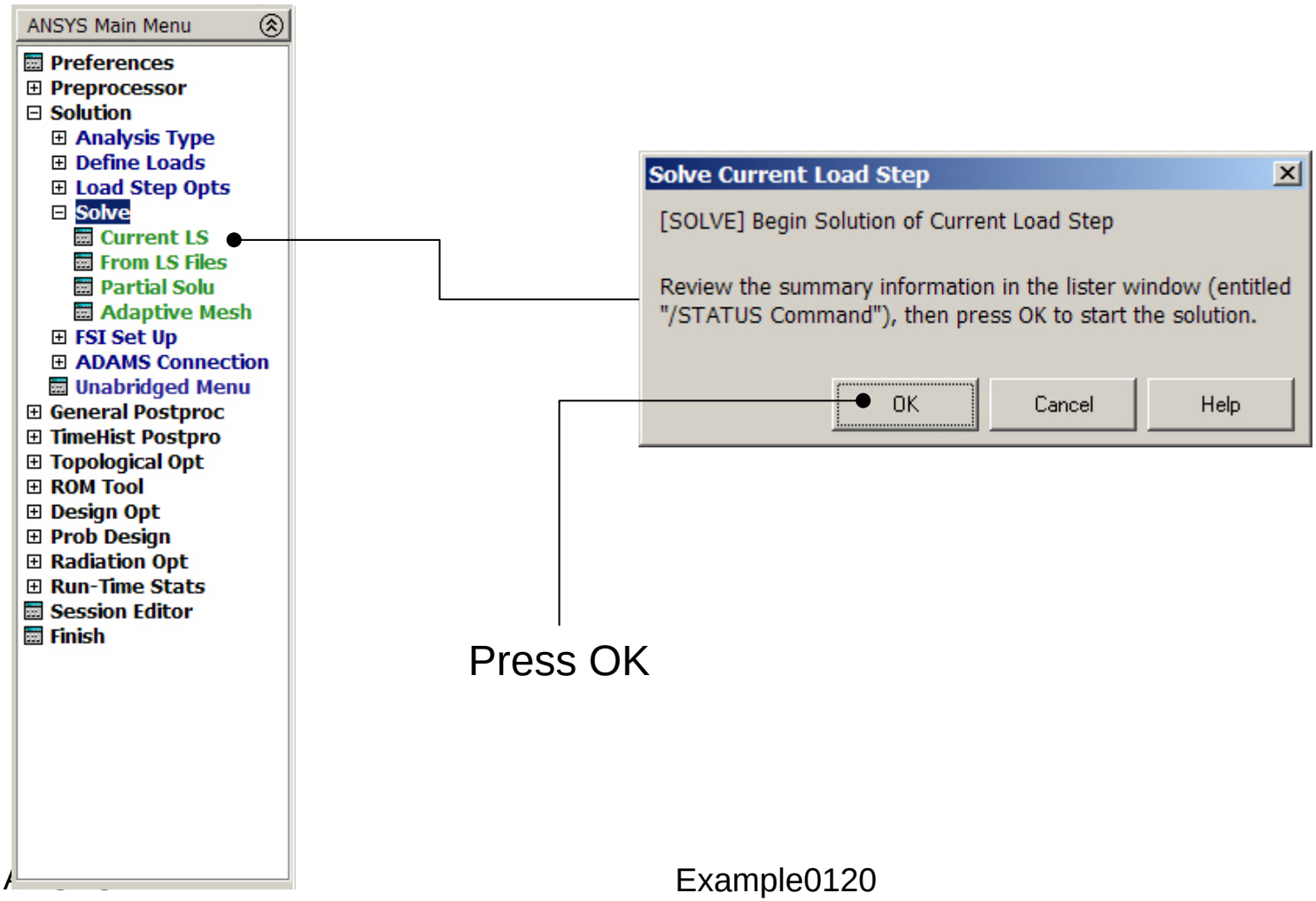
Display of Analysis model



Save the model

Example - Solve

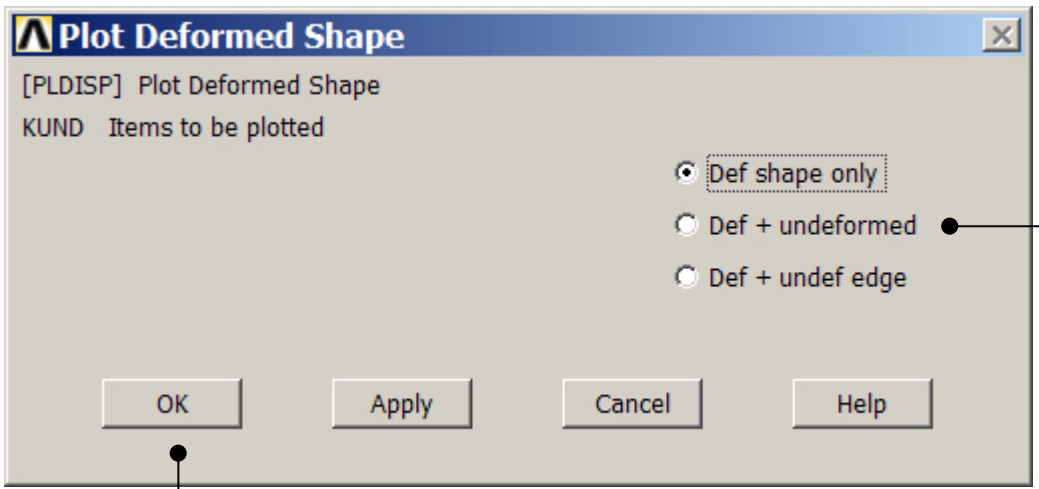
Solution > Solve > Current LS



Press OK

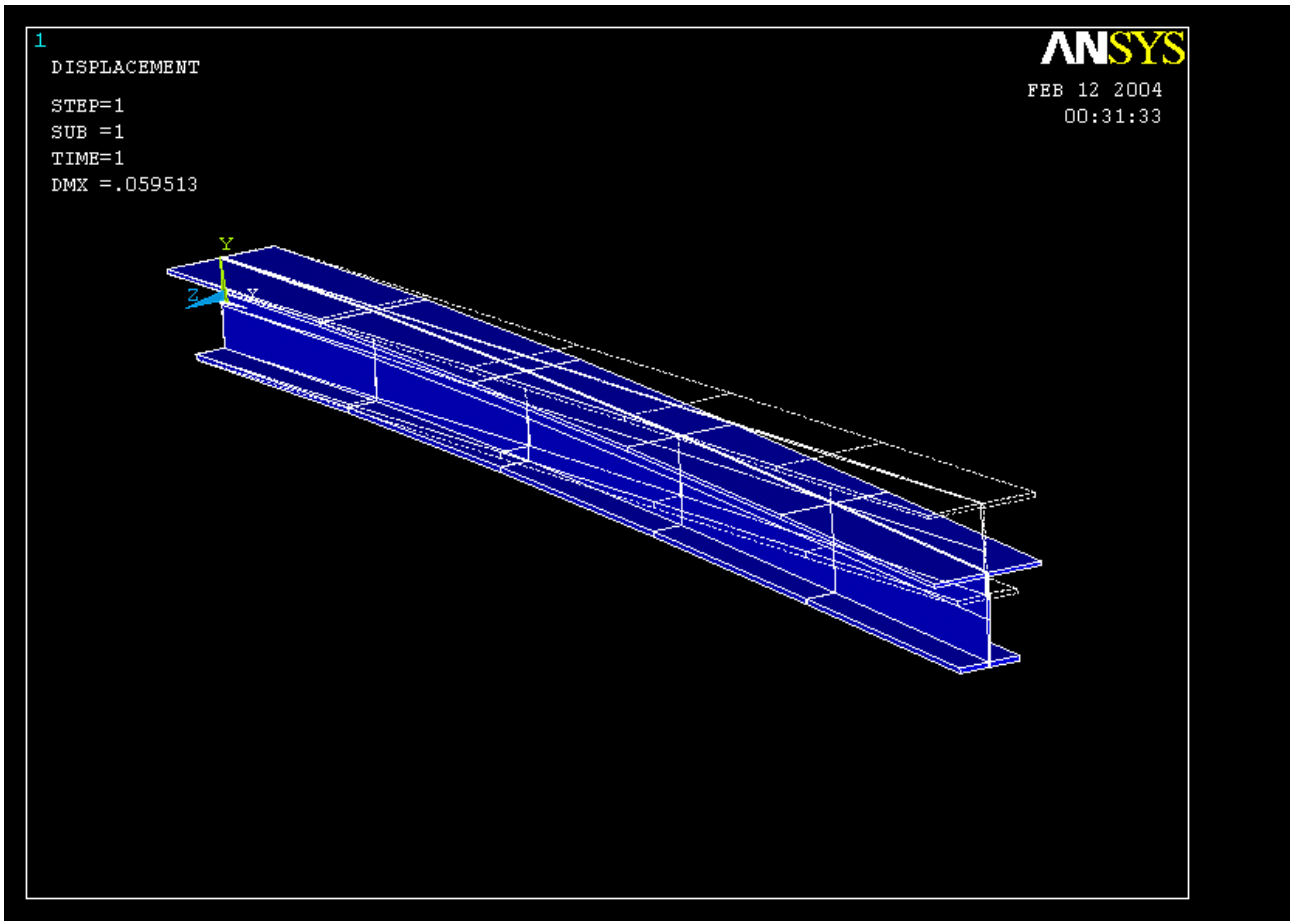
Example - PostProcessing

General Postproc > Plot Results > Deformed Shape



Select “Def+undeformed” and Press OK

Example - PostProcessing



Read Maximum displacement: DMX