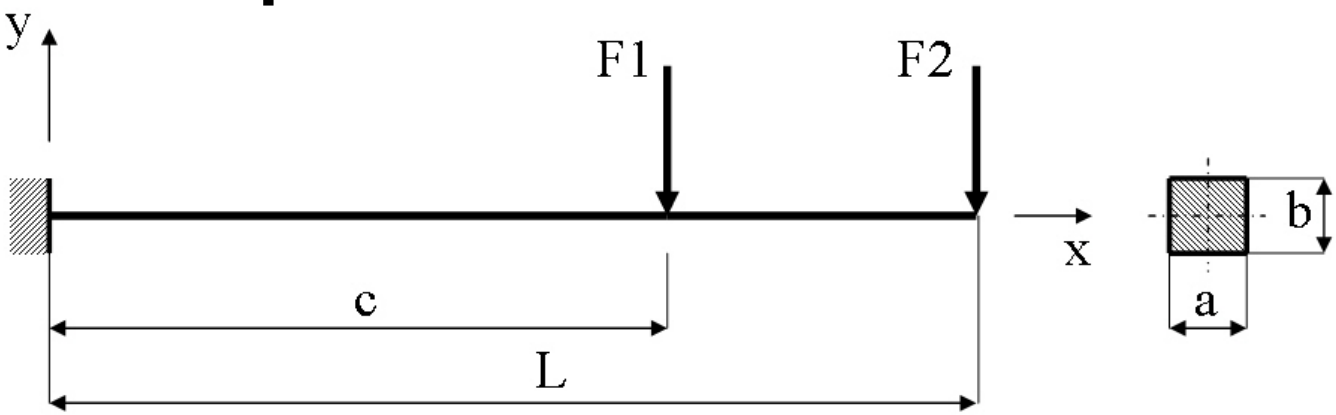
Course in ANSYS

Example0102

Example – Cantilever beam



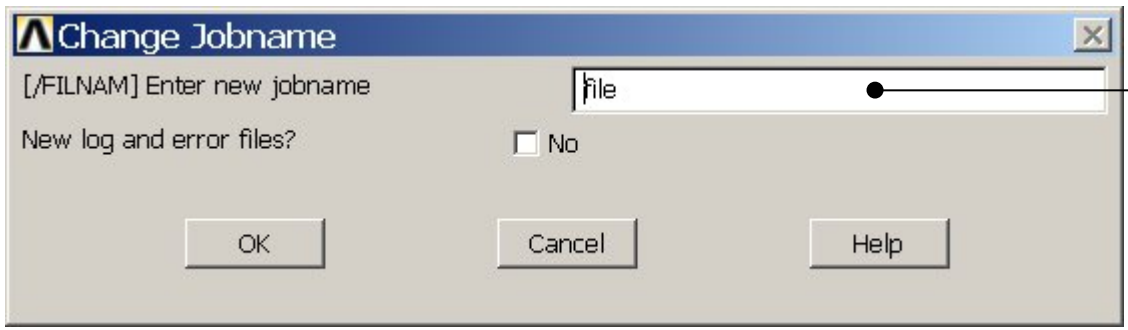
Objective:
Display the moment curve
Tasks:
Obtain values in intermediate points?
Create an element table?
Display the moment curve?
Topics:
Start of analysis, Element table/output, intermediate points, saving/restoring

$E = 210000 N/mm^2$
$\nu = 0.3$
$L = 150mm$
$c = 100mm$
$a = 10mm$
$b = 10mm$
$F1 = 100N$
$F2 = 10N$

Example - title

Utility Menu > File > Change Jobname — GUI

/jobname, Example0102 — Command line entry

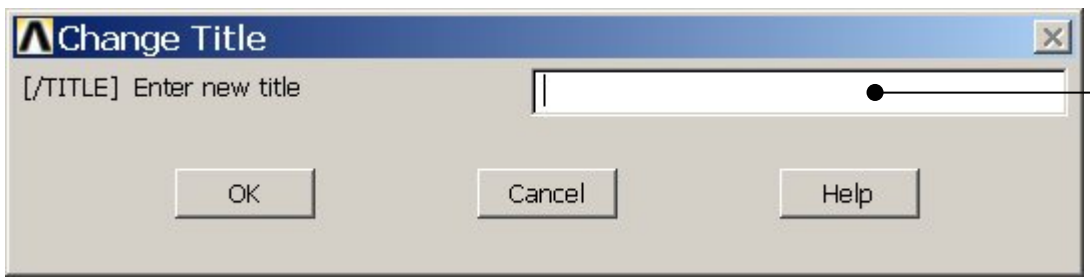


Enter: Example0102

Utility Menu > File > Change Title

/title, Cantilever beam

Enter: Cantilever beam



Example - Keypoints

Note: An empty # result in automatic numbering.

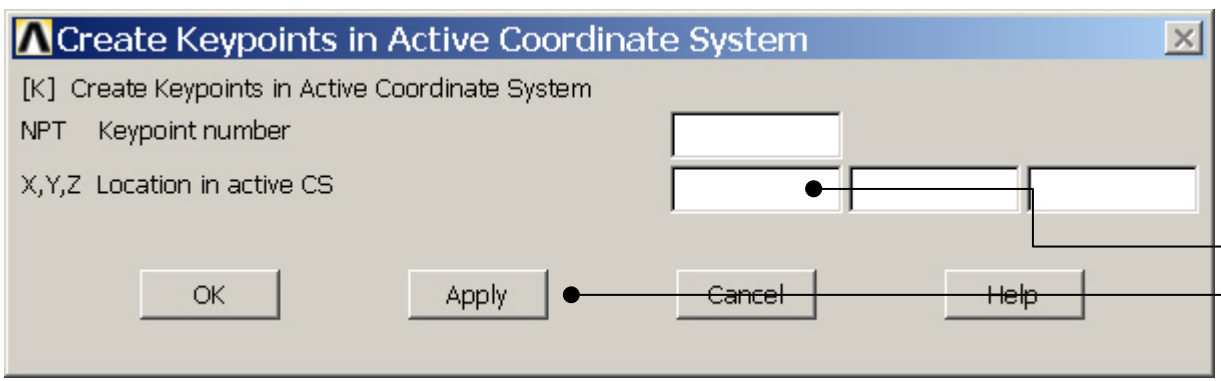
Preprocessor > Modeling > Create > Keypoints > In Active CS

/PREP7
K,,,,
K,,100,,
K,,150,,

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

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

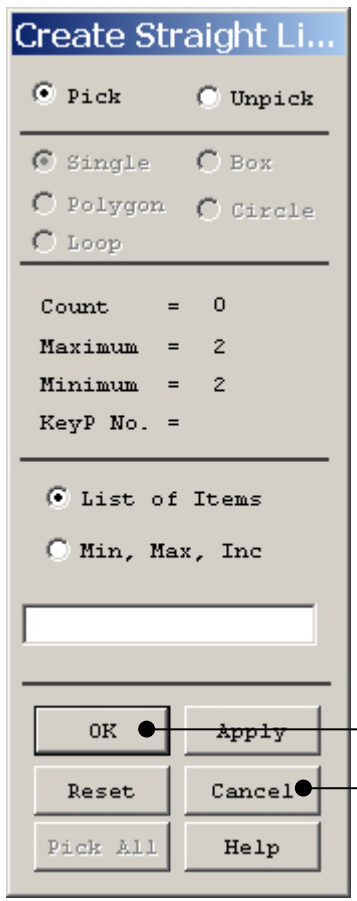
Enter 0,0,0 and
Press **Apply** for KP1
Enter 100,0,0 and
Press **Apply** for KP2
Enter 150,0,0 and
Press **Apply** for KP3



Note: An empty box result in a zero.

Example - Lines

Preprocessor > Modeling > Create > Lines > Lines > Straight Line
Create a line between Keypoint 1 and Keypoint 2 and so on.
L,1,2
L,2,3



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:

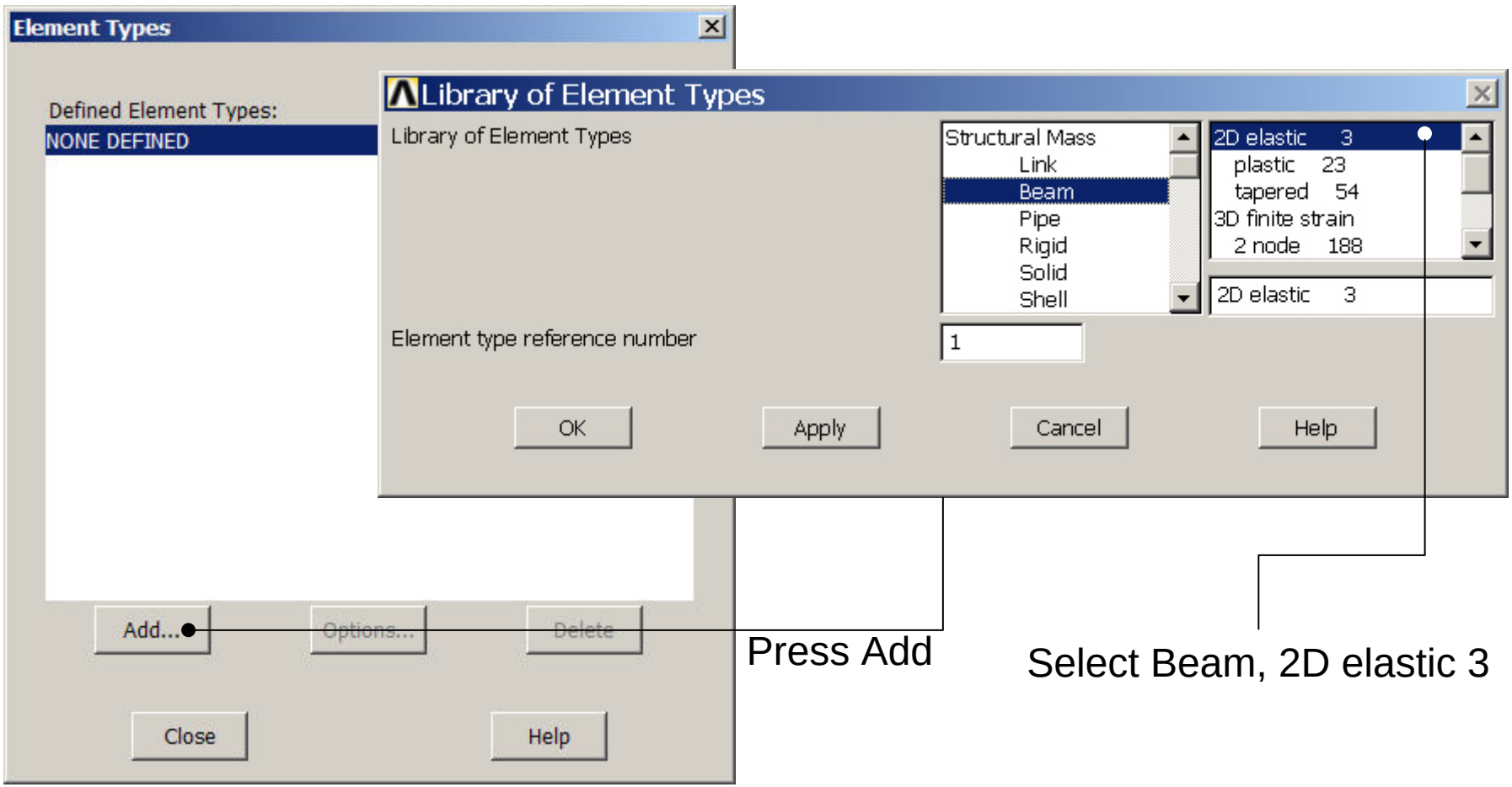
Pick: upward arrow

Unpick: downward arrow

Press OK or Cancel to finish selection

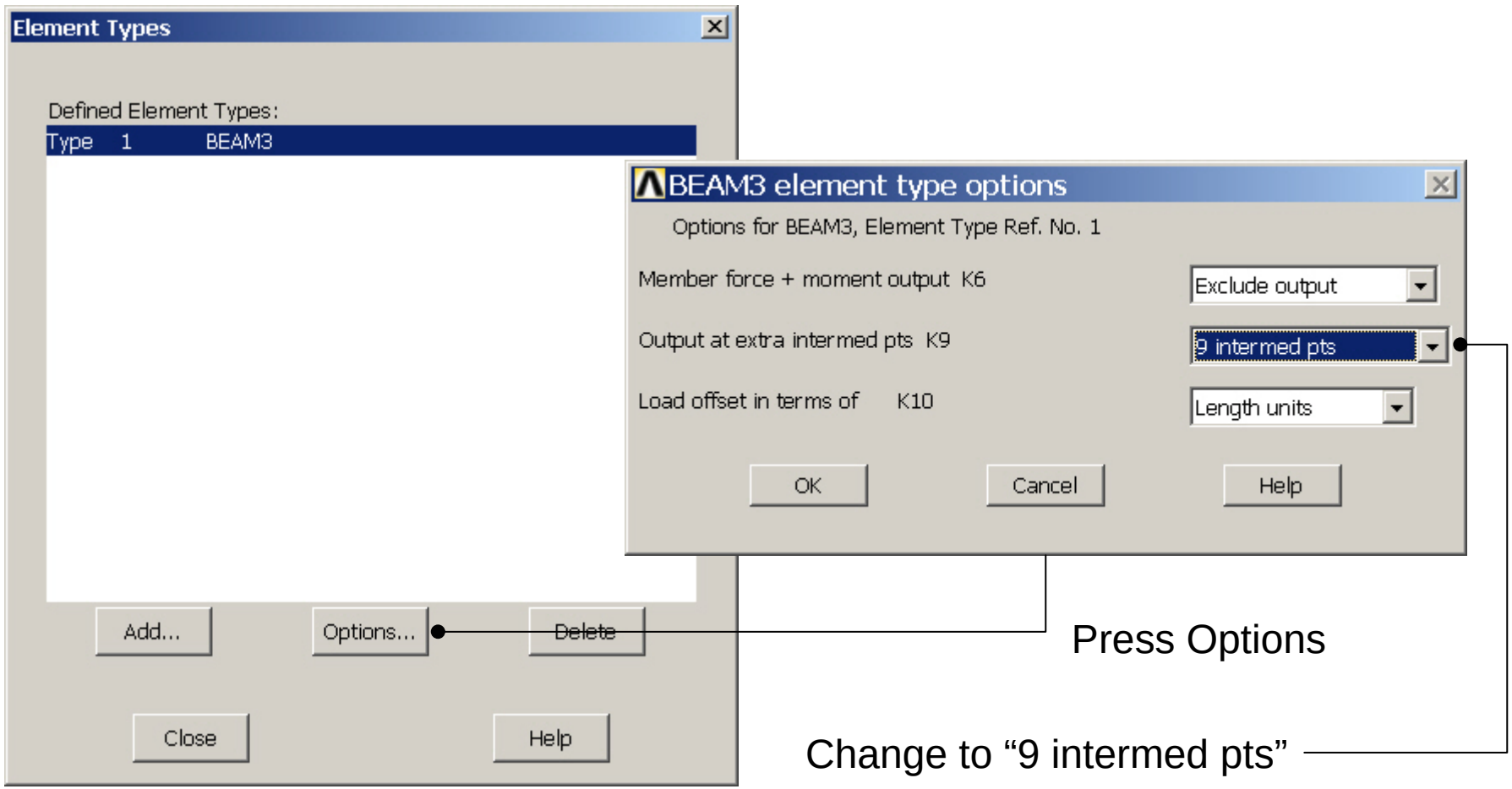
Example – Element Type

Preprocessor > Element Type > Add/Edit/Delete



Example - Element Type

Preprocessor > Element Type > Add/Edit/Delete



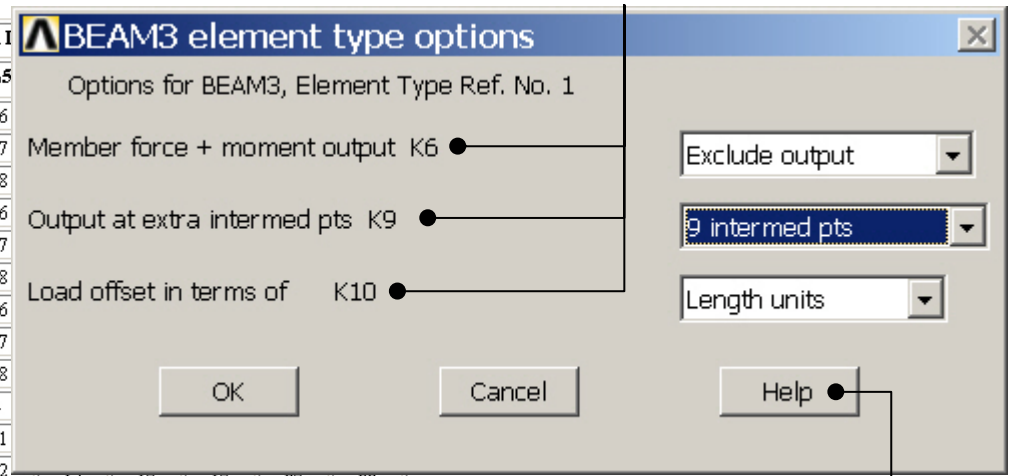
Example - Element Type

Notice the key option number for later use

Table 3.7. BEAM3 Item and Sequence Numbers (KEYOPT(9) = 9)

Output Quantity Name	ETABLE and ESOL Command I												
	Item	E	I	IL1	IL2	IL3	IL4	IL5					
SDIR	LS	-	1	4	7	10	13	16					
SBYT	LS	-	2	5	8	11	14	17					
SBYB	LS	-	3	6	9	12	15	18					
EPELDIR	LEPEL	-	1	4	7	10	13	16					
EPELBYT	LEPEL	-	2	5	8	11	14	17					
EPELBYB	LEPEL	-	3	6	9	12	15	18					
EPTHDIR	LEPTH	-	1	4	7	10	13	16					
EPTHBYT	LEPTH	-	2	5	8	11	14	17					
EPTHBYB	LEPTH	-	3	6	9	12	15	18					
EPINAXL	LEPTH	34	-	-	-	-	-	-					
SMAX	NMISC	-	1	3	5	7	9	11					
SMIN	NMISC	-	2	4	6	8	10	12					
MFORX	SMISC	-	1	7	13	19	25	31	37	43	49	55	61
MFORY	SMISC	-	2	8	14	20	26	32	38	44	50	56	62
MMOMZ	SMISC	-	6	12	18	24	30	36	42	48	54	60	66
P1	SMISC	-	67	-	-	-	-	-	-	-	-	-	68
OFFST1	SMISC	-	69	-	-	-							
P2	SMISC	-	71	-	-	-							
OFFST2	SMISC	-	73	-	-	-							
P3	SMISC	-	75	-	-	-	-	-	-	-	-	-	-
P4	SMISC	-	-	-	-	-	-	-	-	-	-	-	76

		Pseudo Node			
		1	2	3	4
TEMP	LBFE	1	2	3	4

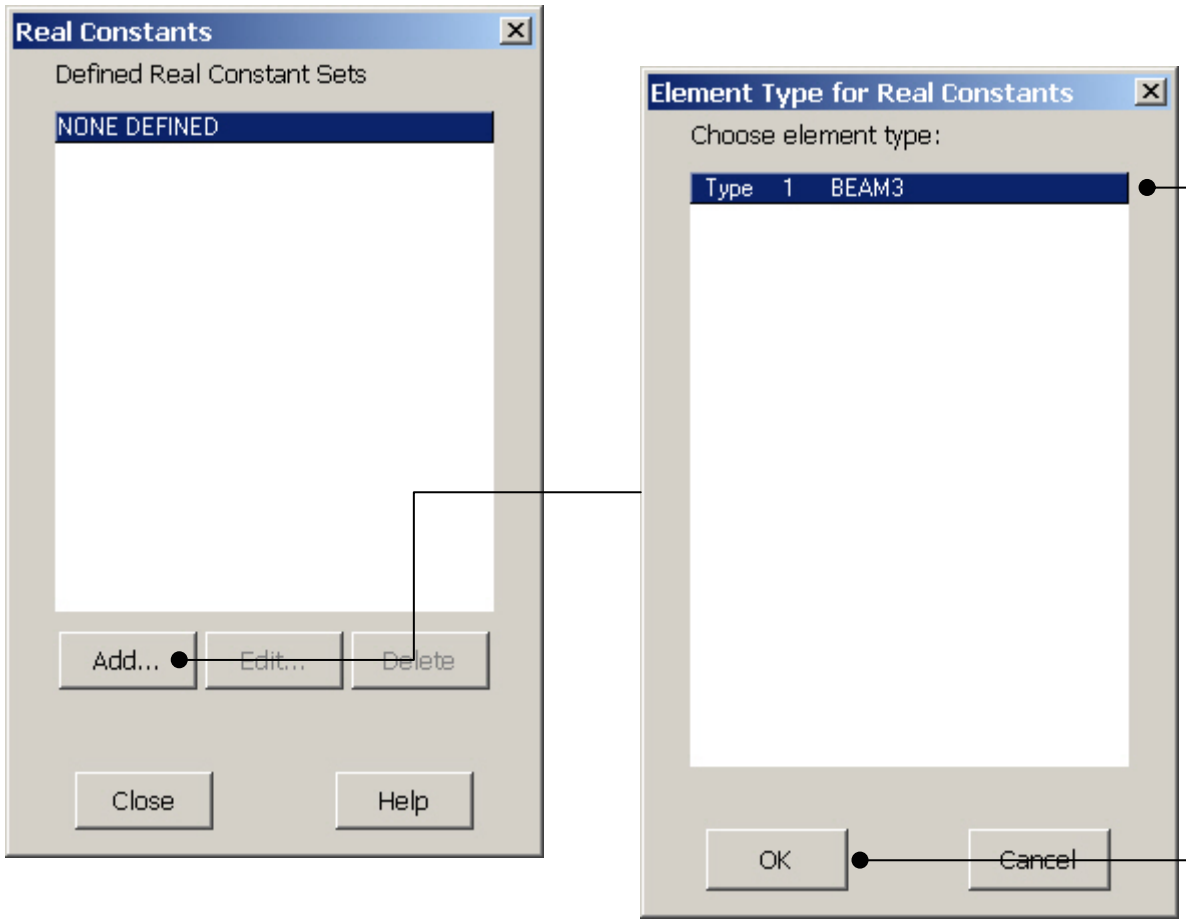


Remember MFORX, SMISC,6…66

Press Help to launch the documentation for this element type.

Example – Real Constants

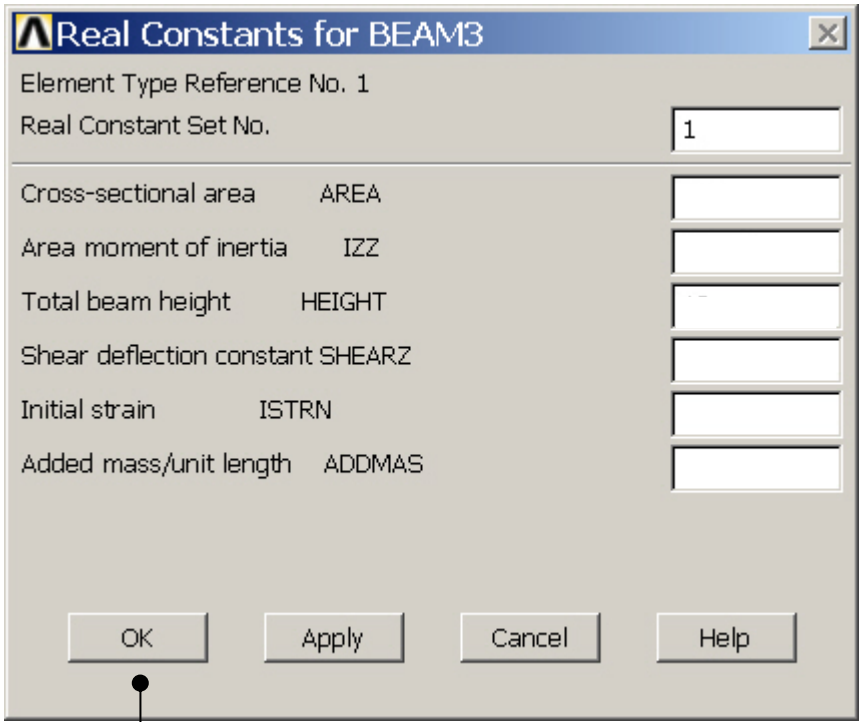
Preprocessor > Real Constants > Add



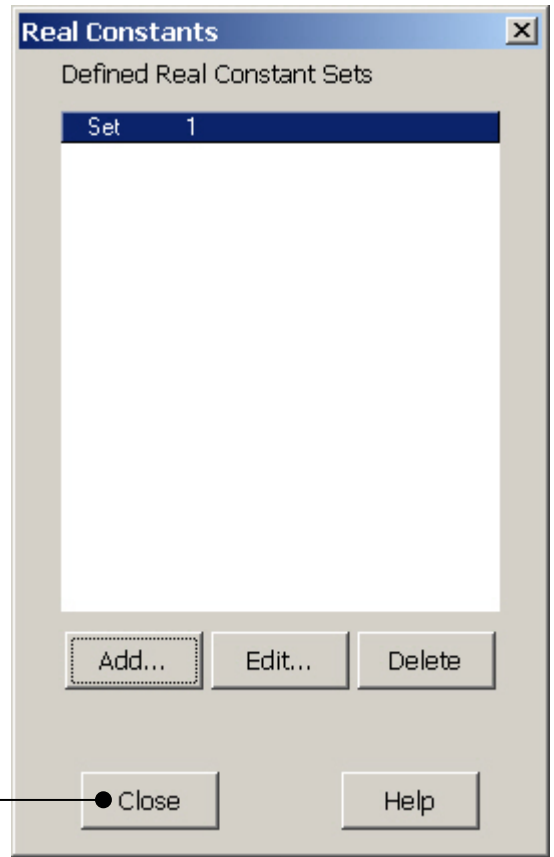
Place the cursor on the relevant element and press OK

Example - Real Constants

Preprocessor > Real Constants > Add



Enter cross-sectional data

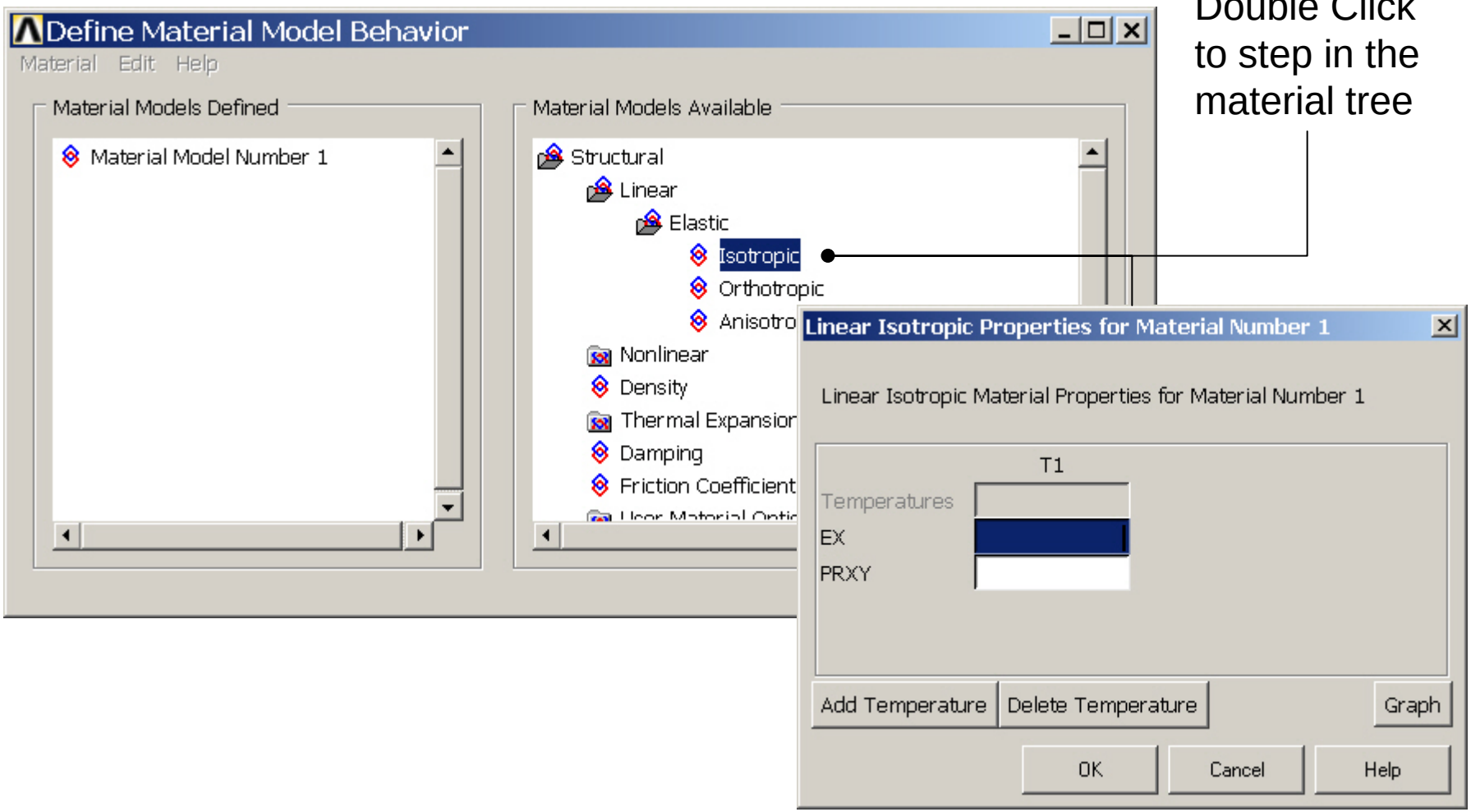


Press Close to finish

Press OK

Example - Material Properties

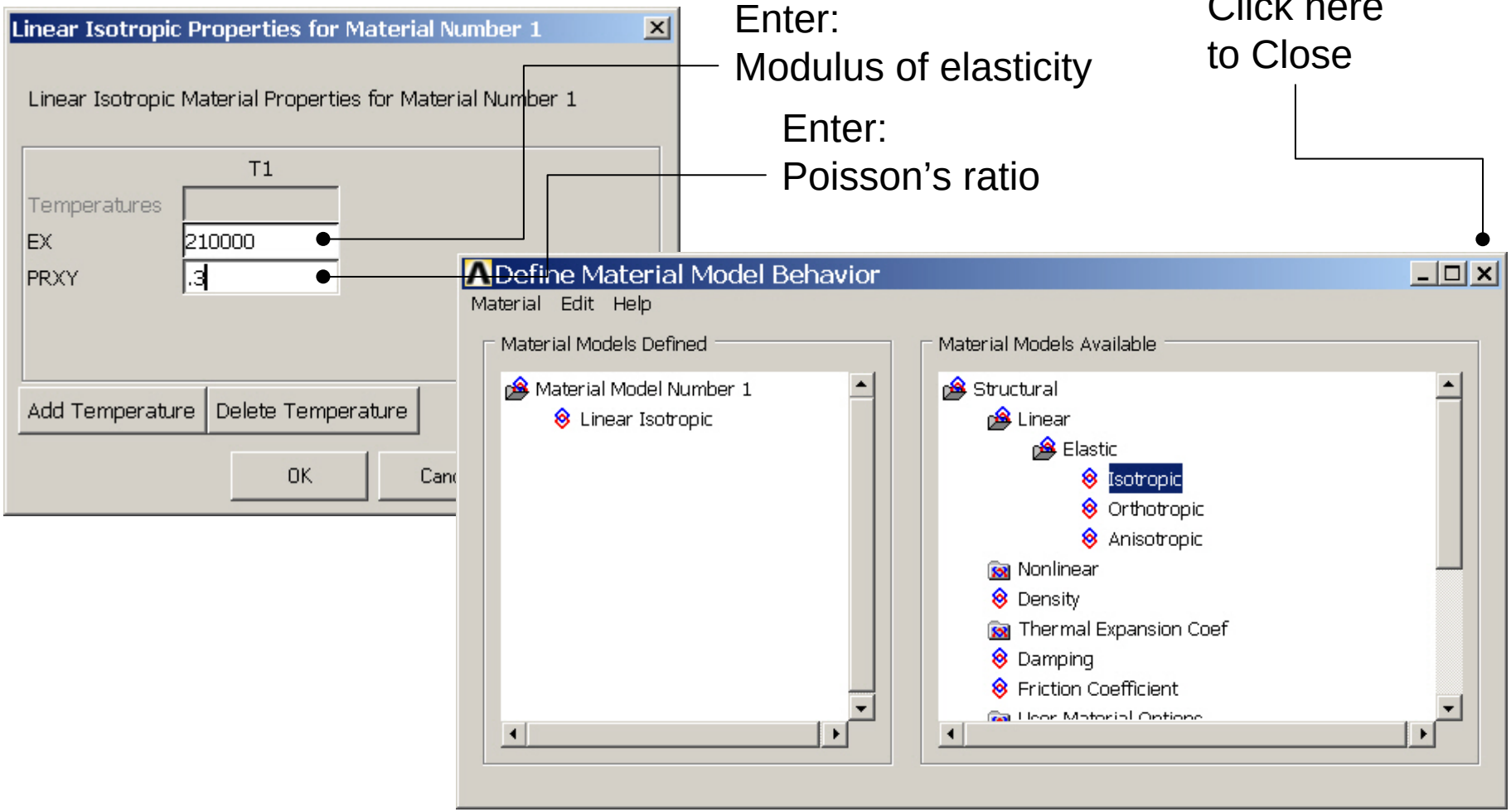
Preprocessor > Material Props > Material Models



Double Click to step in the material tree

Example - Material Properties

Preprocessor > Material Props > Material Models



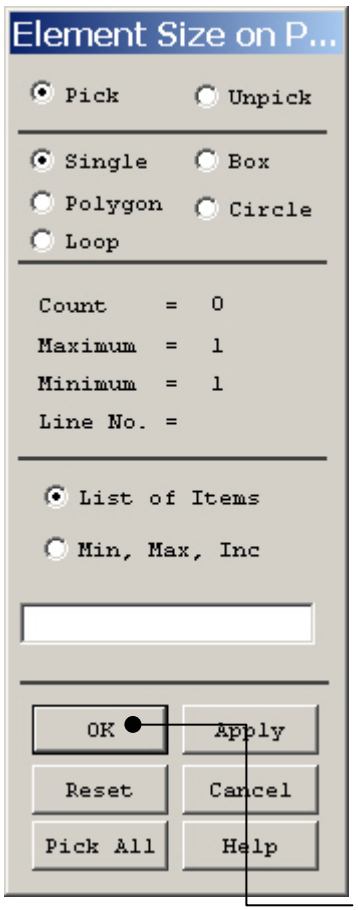
Enter:
Modulus of elasticity

Enter:
Poisson's ratio

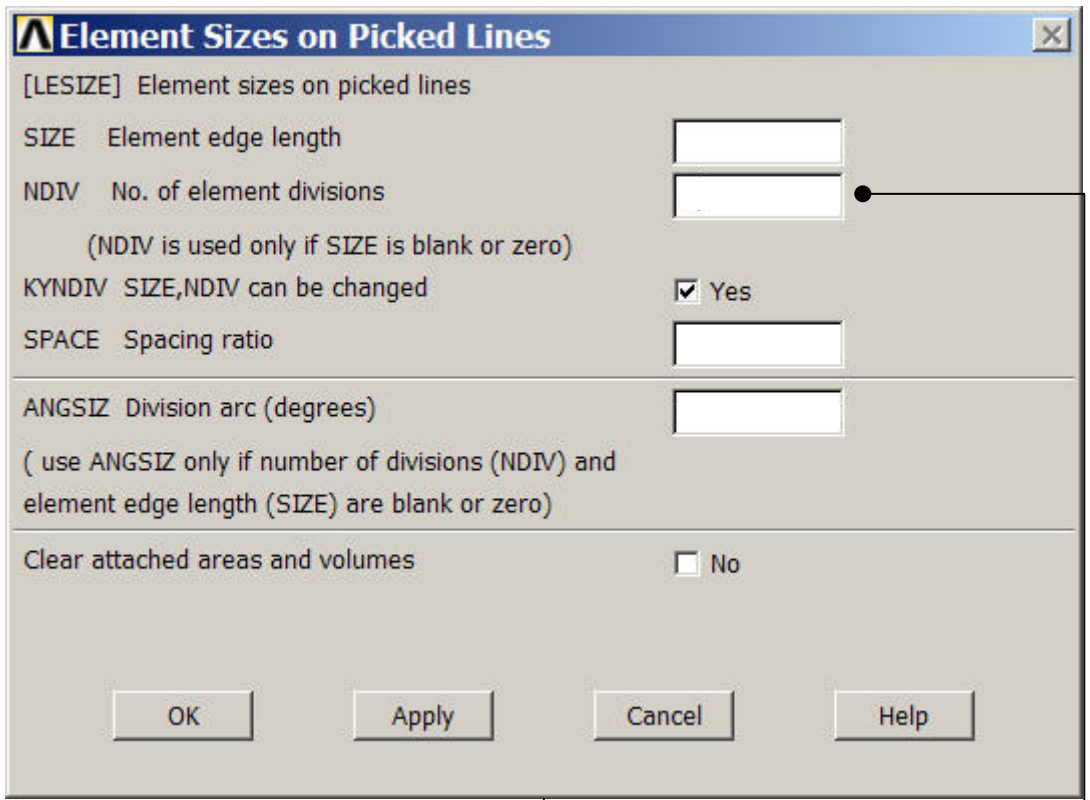
Click here
to Close

Example - Meshing

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



Select/Pick Lines to specify mesh size for

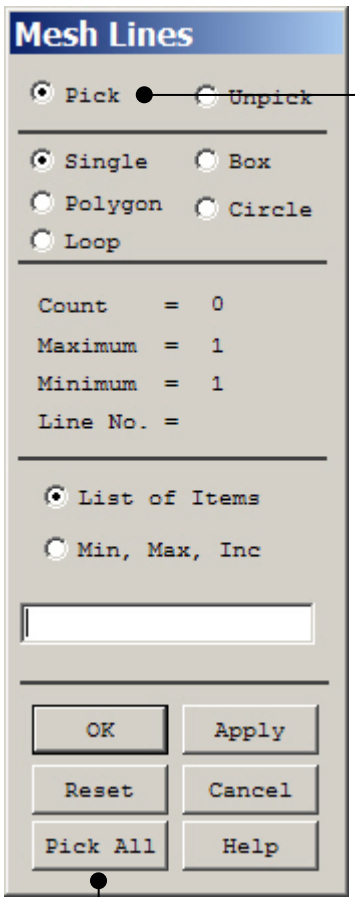


Press OK when finish with selection

Enter 1

Example - Meshing

Preprocessor > Meshing > Mesh > Lines



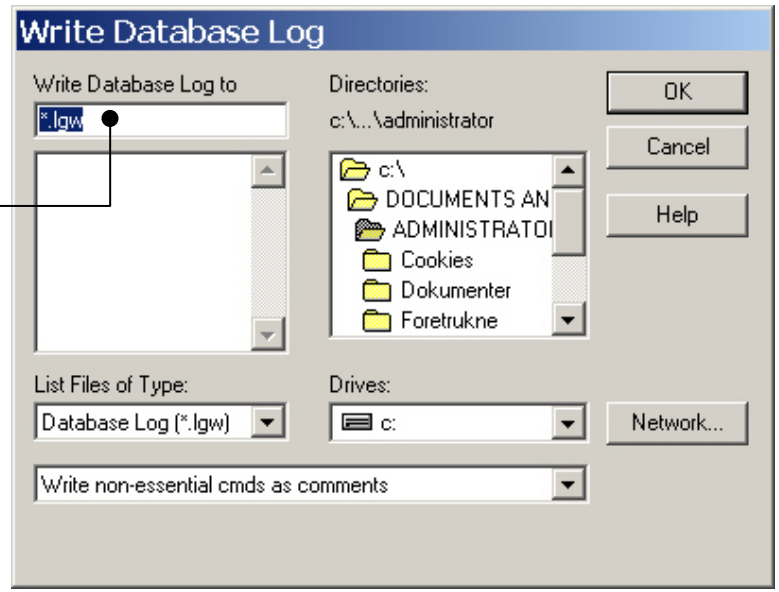
Select individual lines to be meshed by Picking

Select all lines defined to be meshed

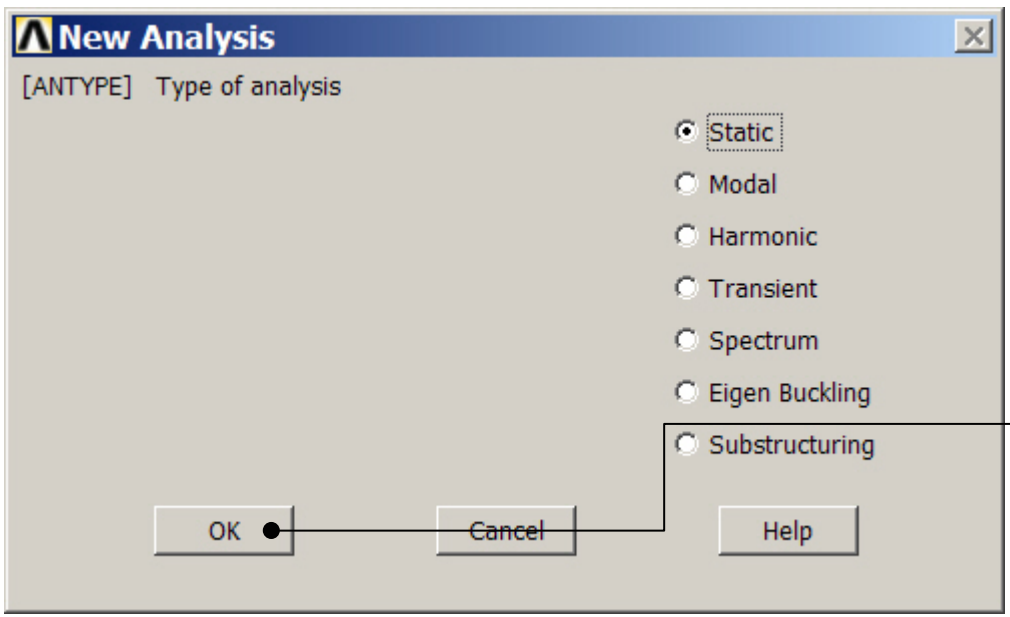
Example – Analysis Type

File > Write DB log file

Enter “example0102.lgw”



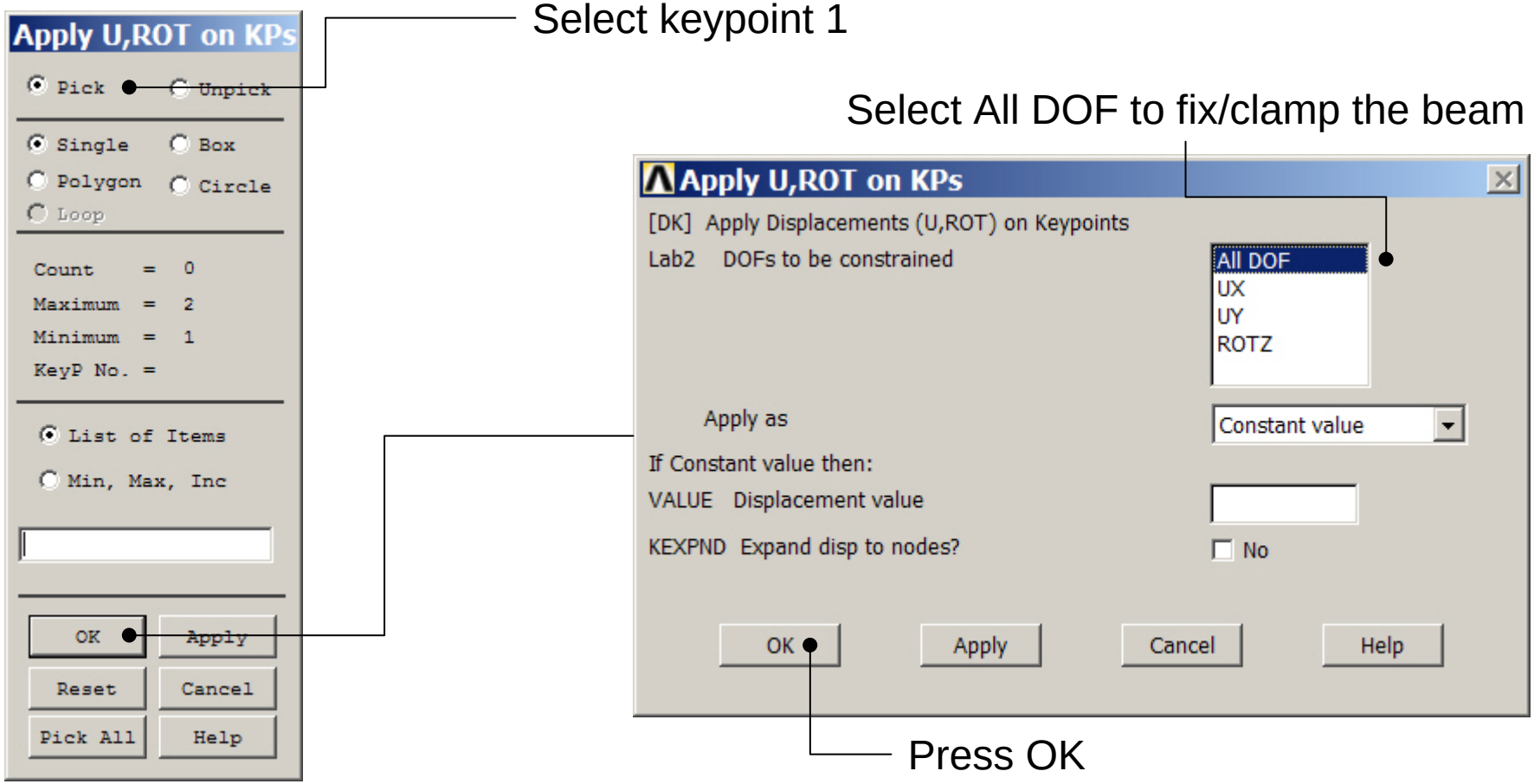
Solution > Analysis Type > New Analysis



Press OK

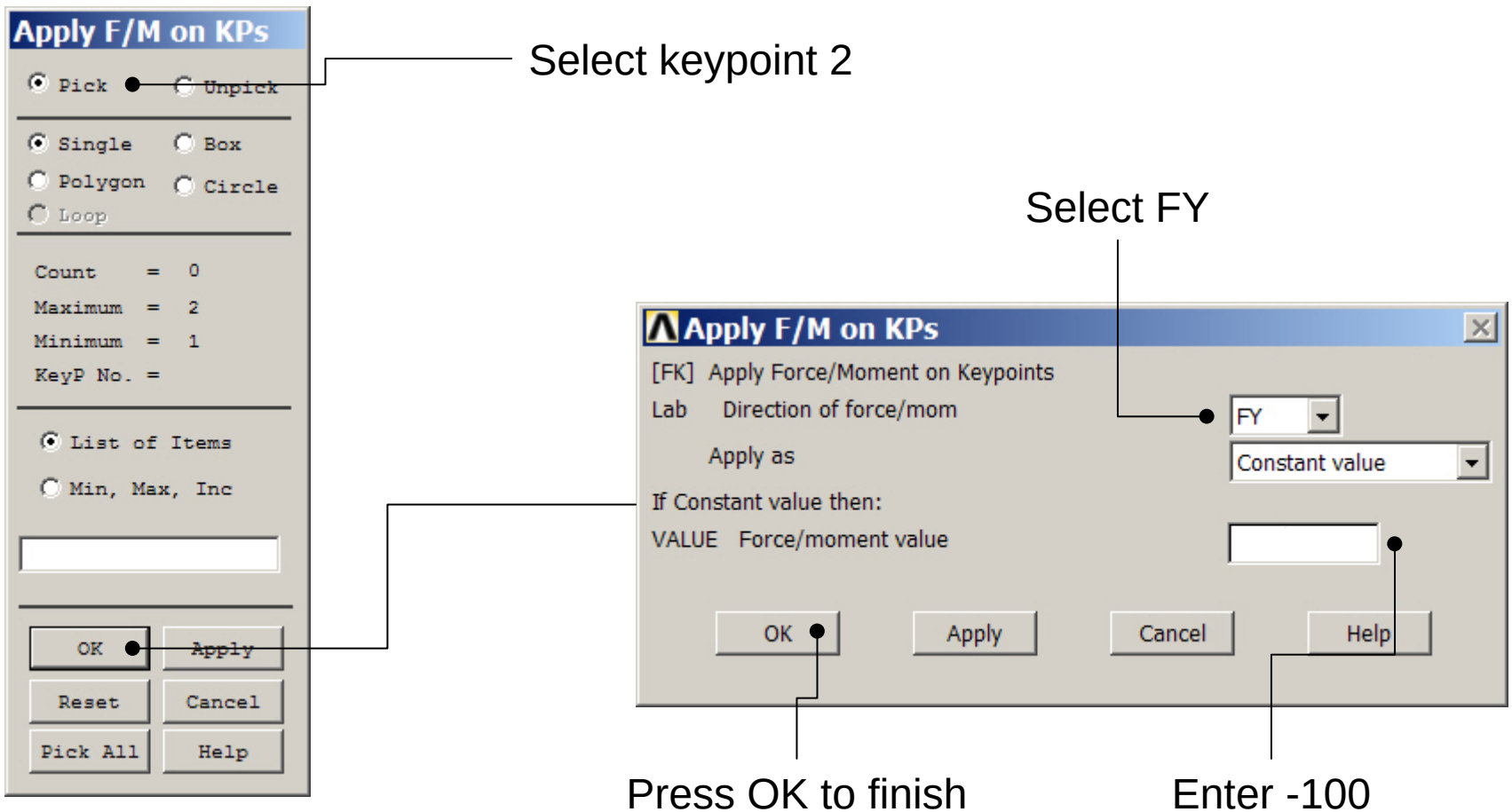
Example – Define Loads

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



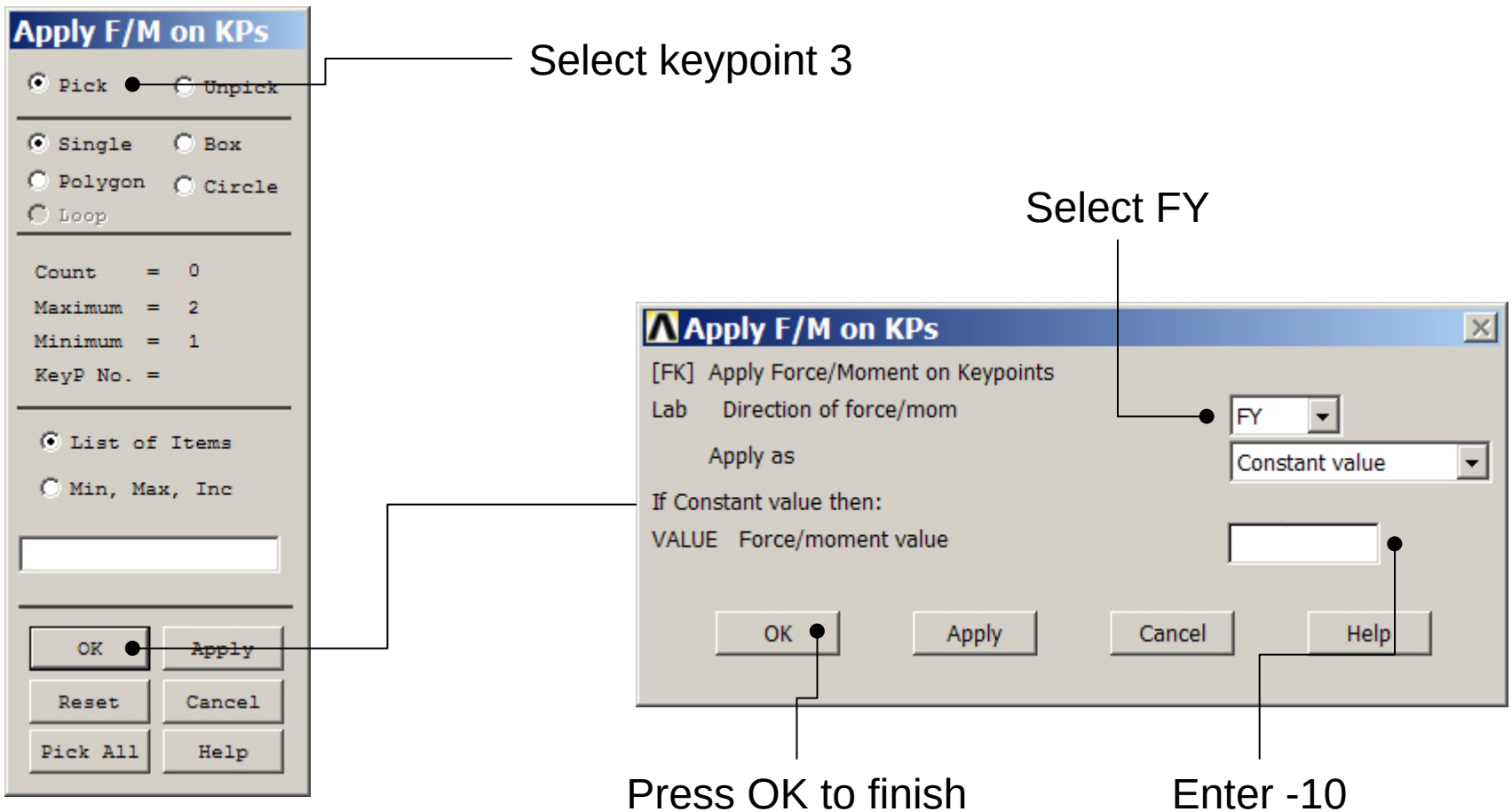
Example – Define Loads

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

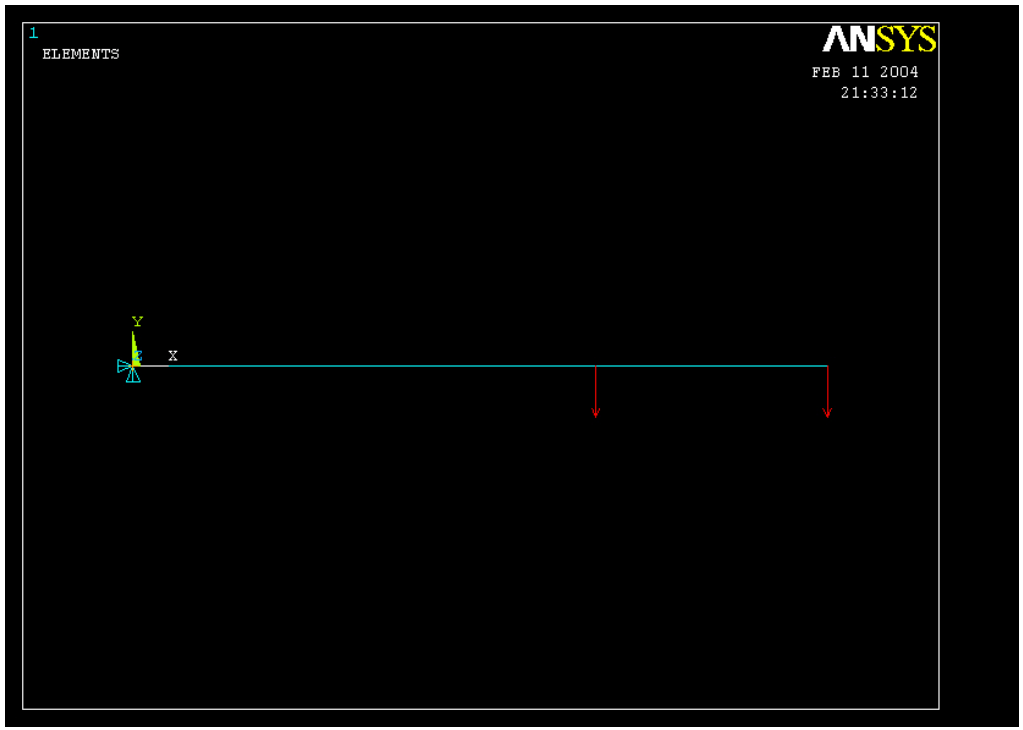


Example – Define Loads

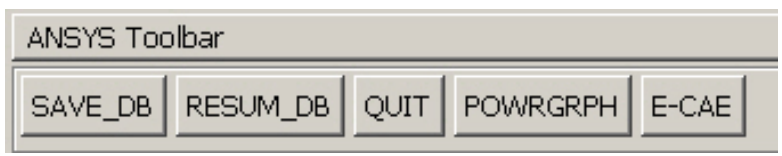
Solution > Define Loads > Apply > Structural > Force/Moment > On Keypoints



Example - Save



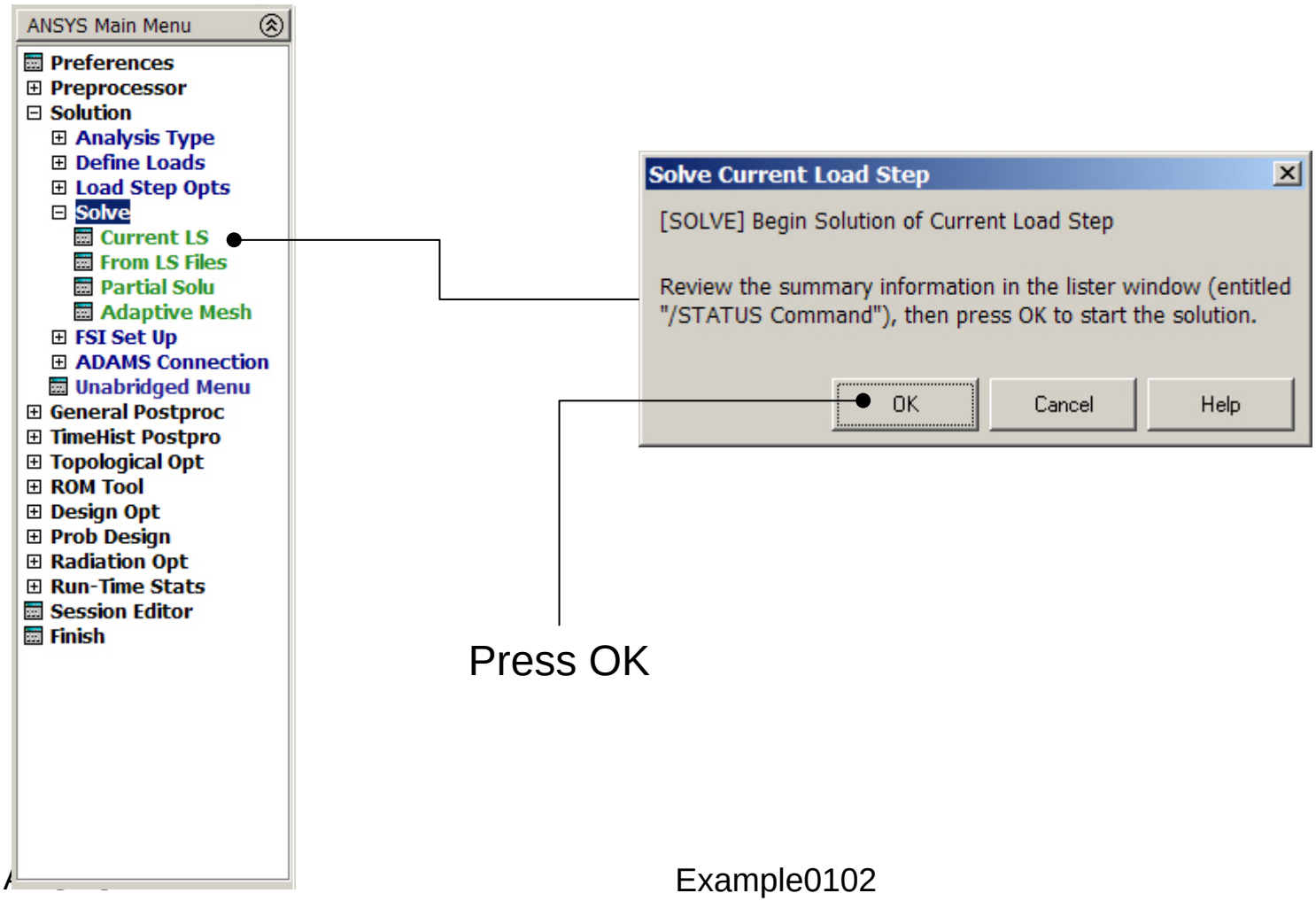
Display of Analysis model



Save the model

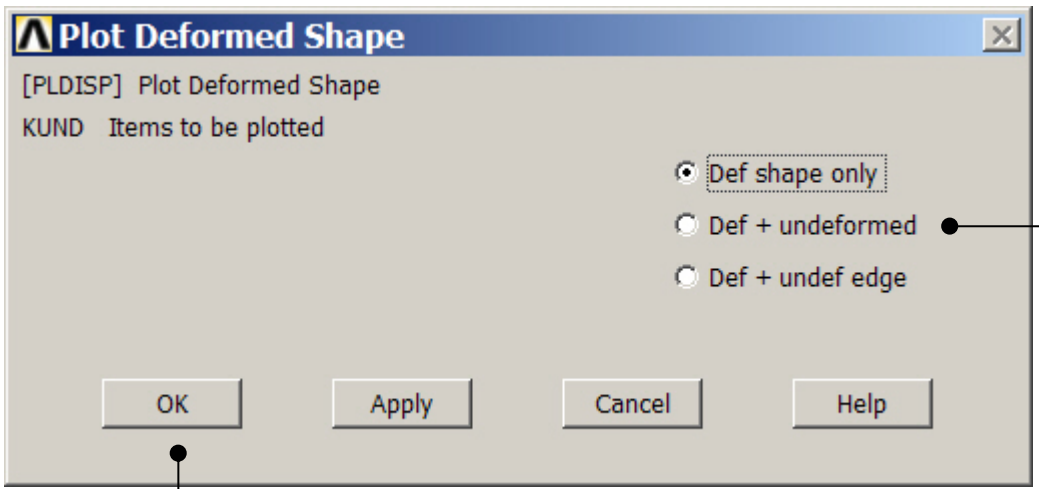
Example - Solve

Solution > Solve > Current LS



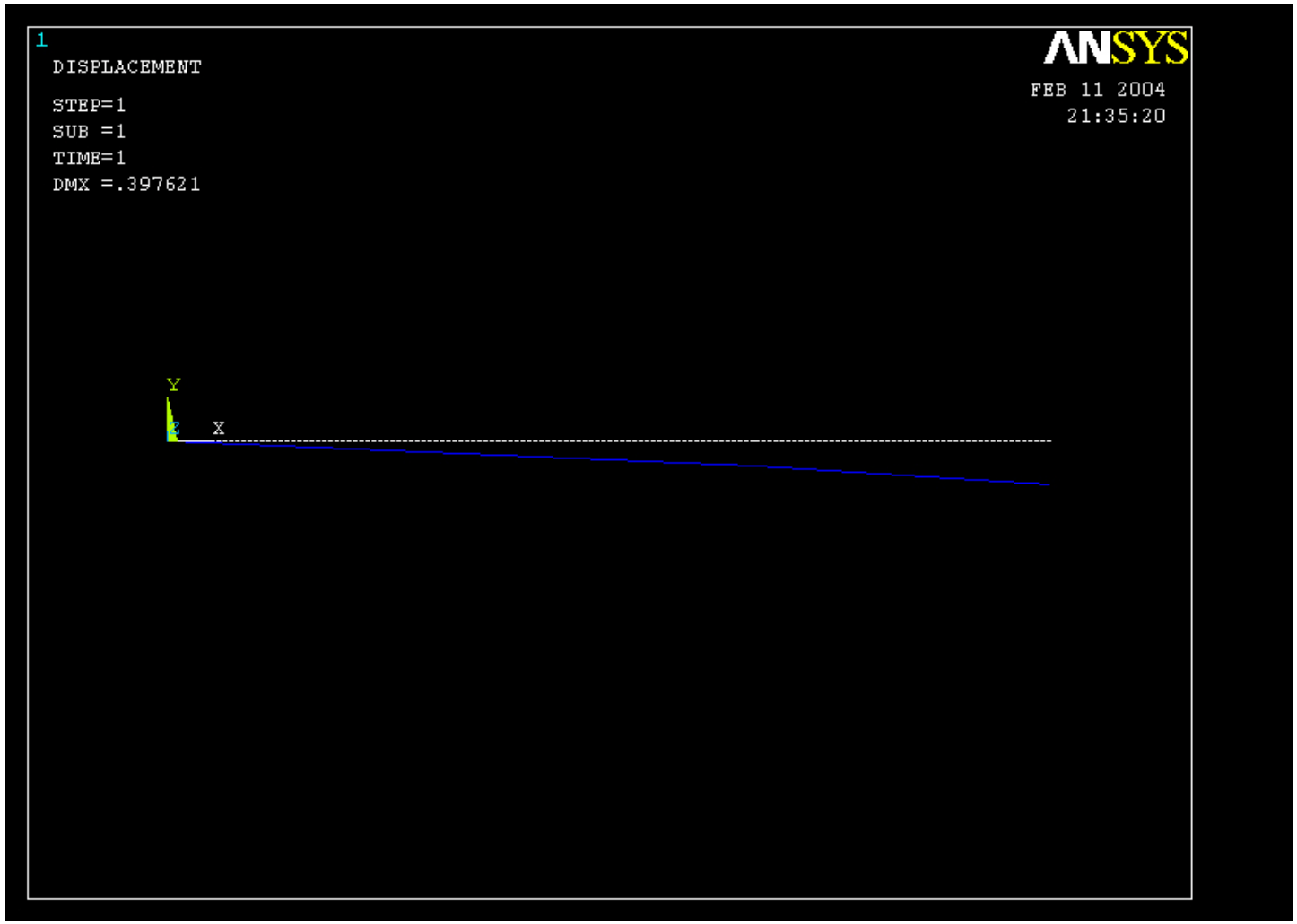
Example - PostProcessing

Solution > General Postproc > Plot Results > Deformed Shape

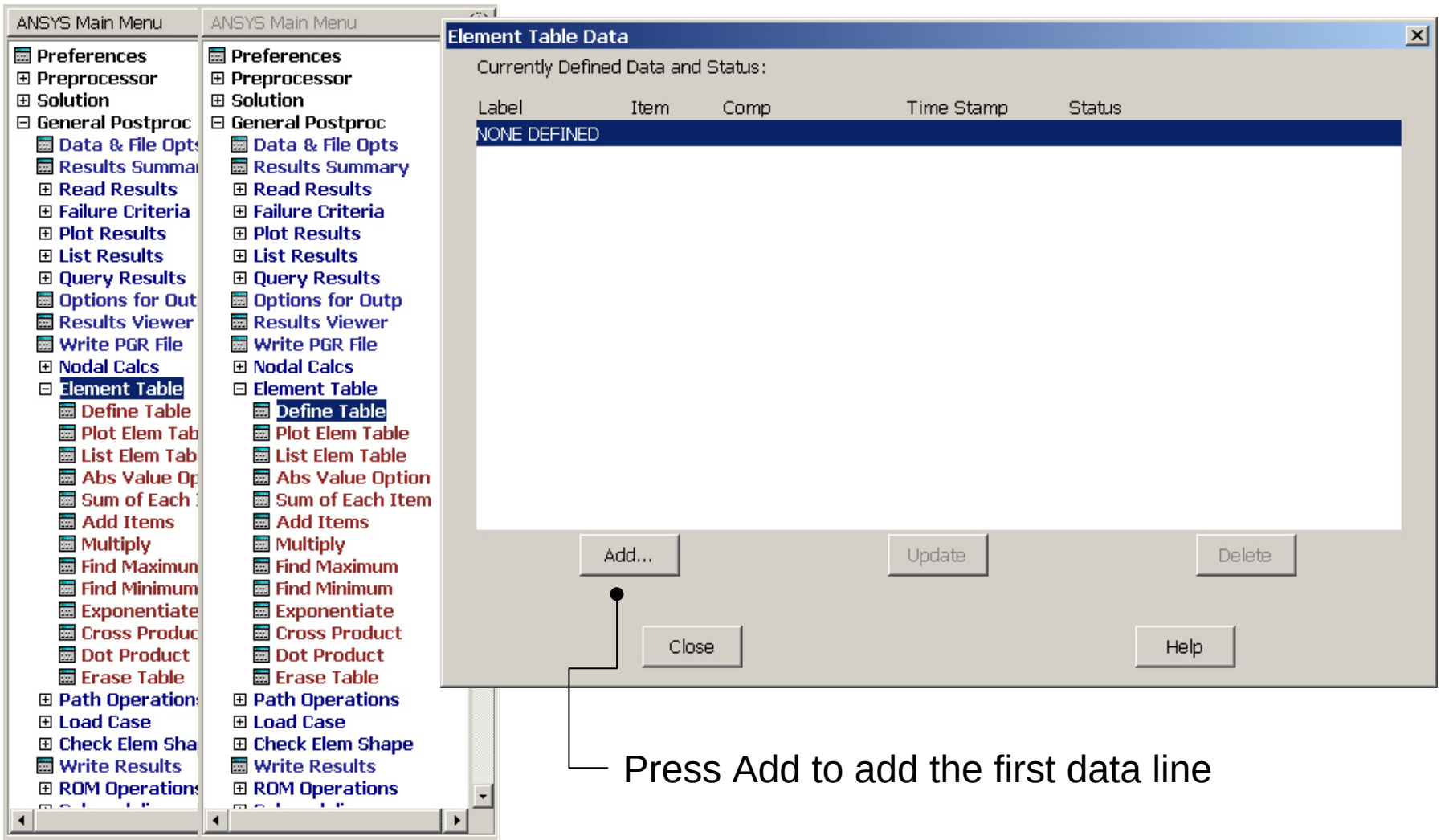


Select “Def+undeformed” and Press OK

Example - PostProcessing

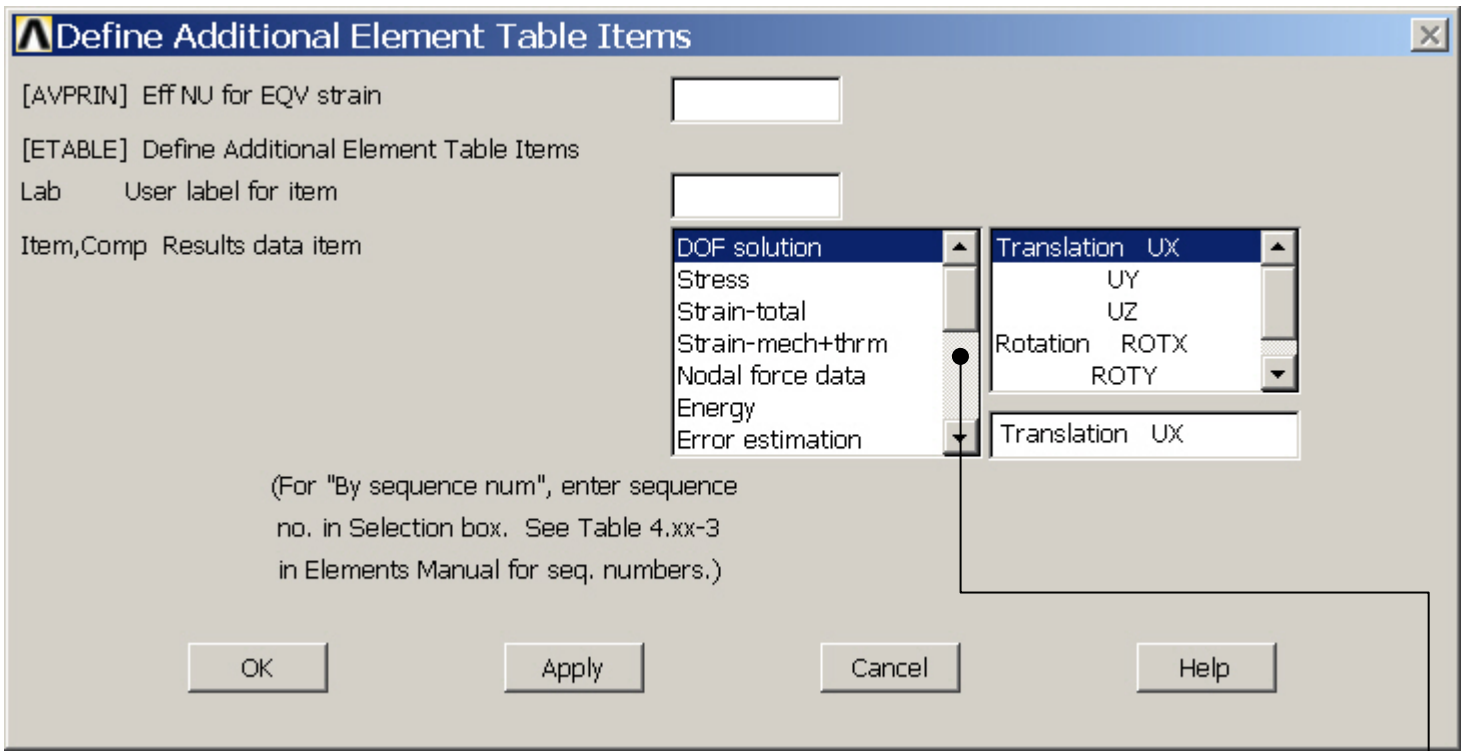


Example – Element Table



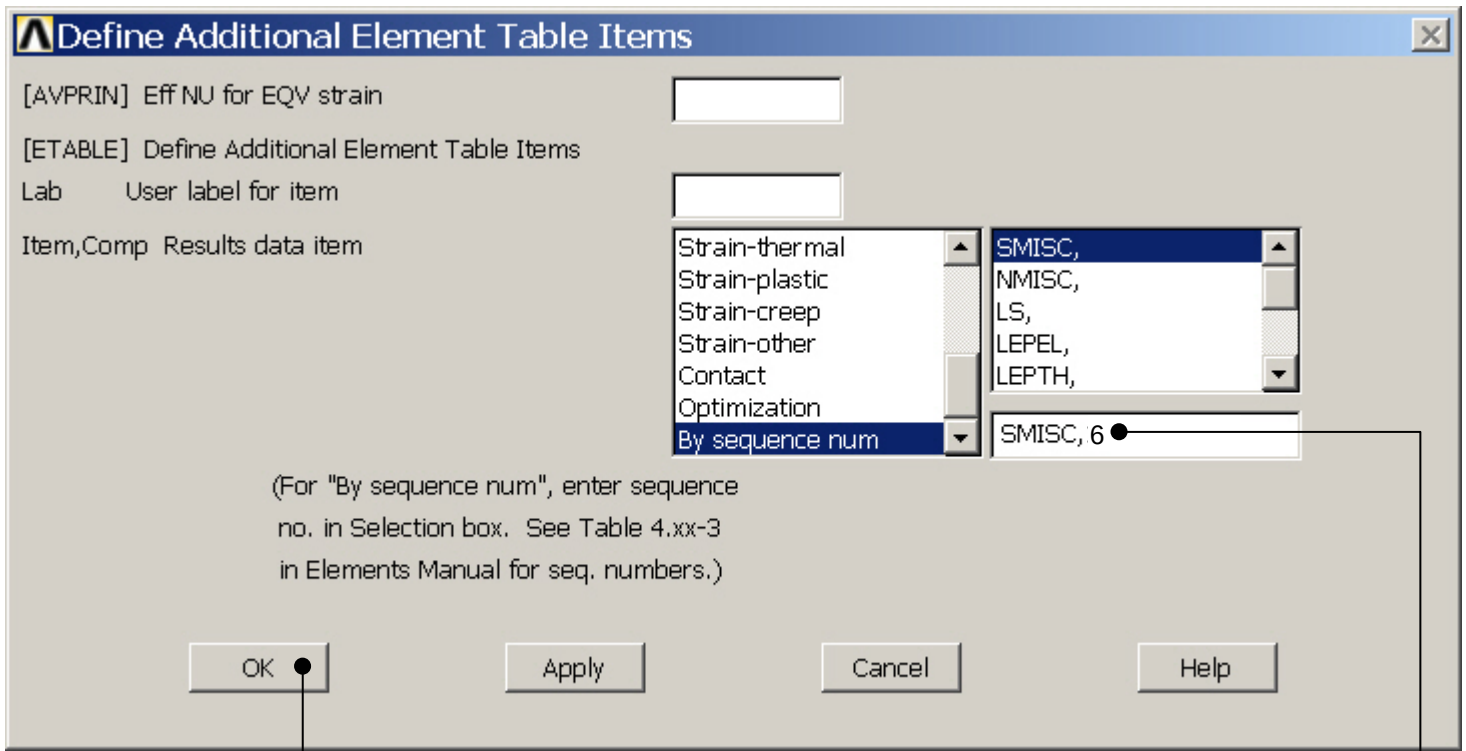
Press Add to add the first data line

Example – Element Table



Scroll down in this menu to find the line “By sequence number”

Example – Element Table

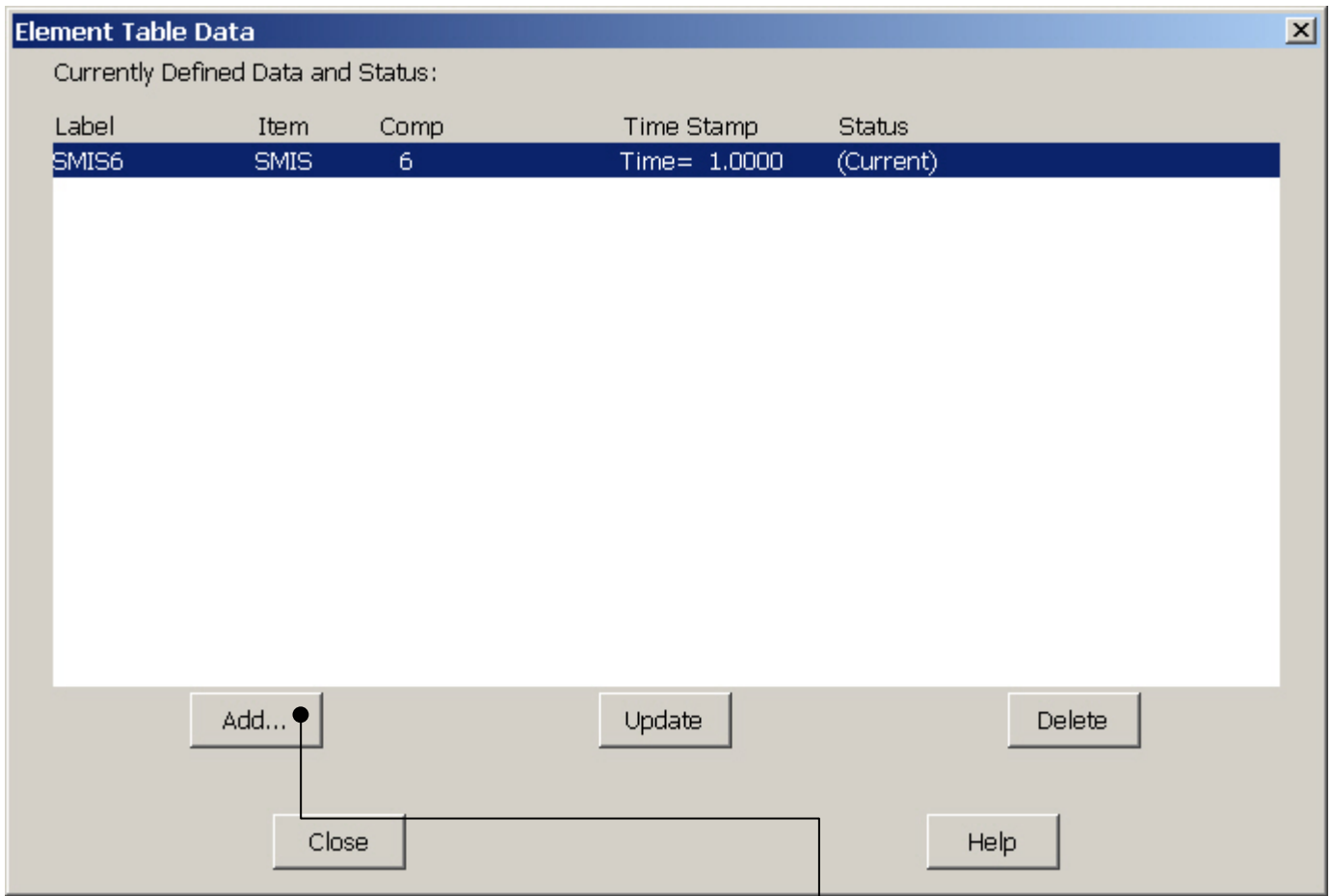


Press OK

Enter 6 as found in table 3.2

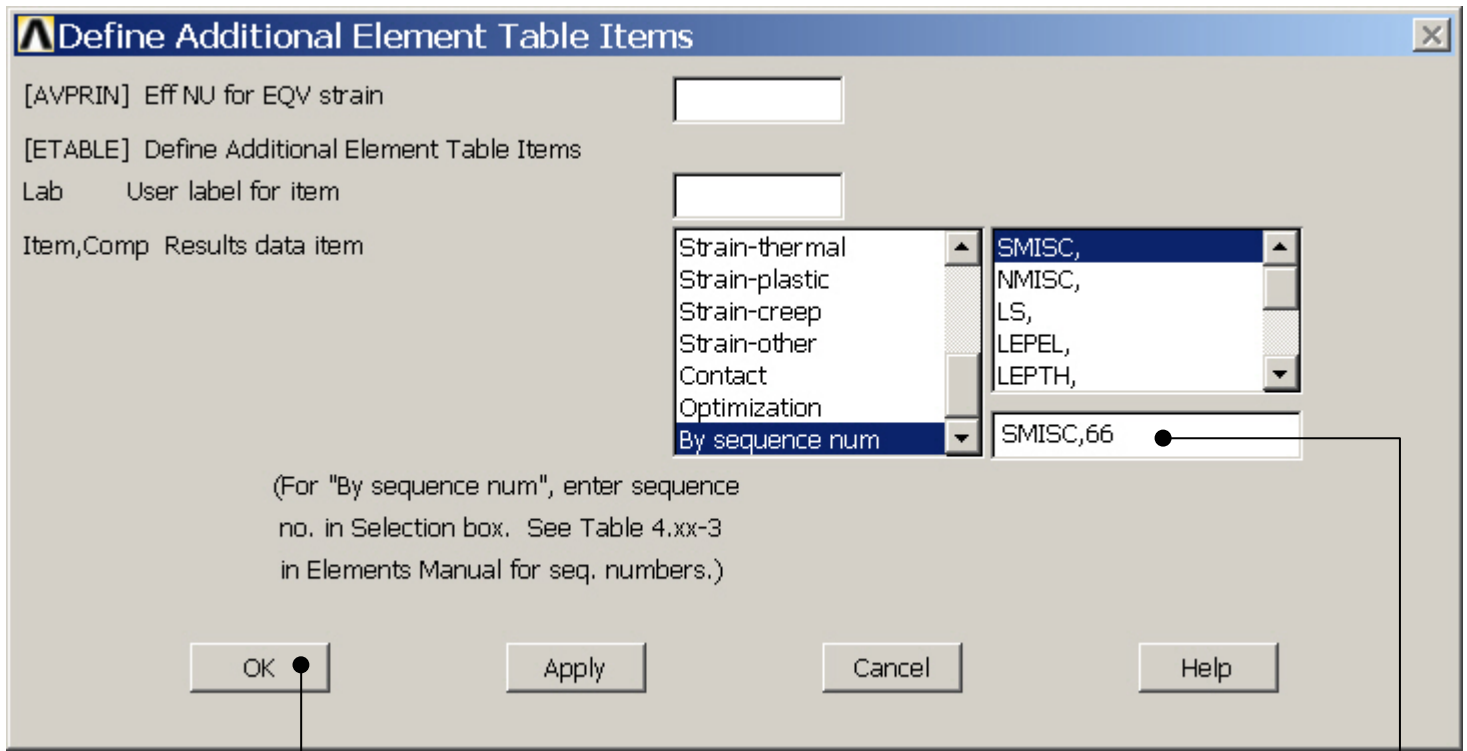
From table 3.2 MMOMZ, SMISC,6,66

Example – Element Table



Press Add to add the second data line

Example – Element Table

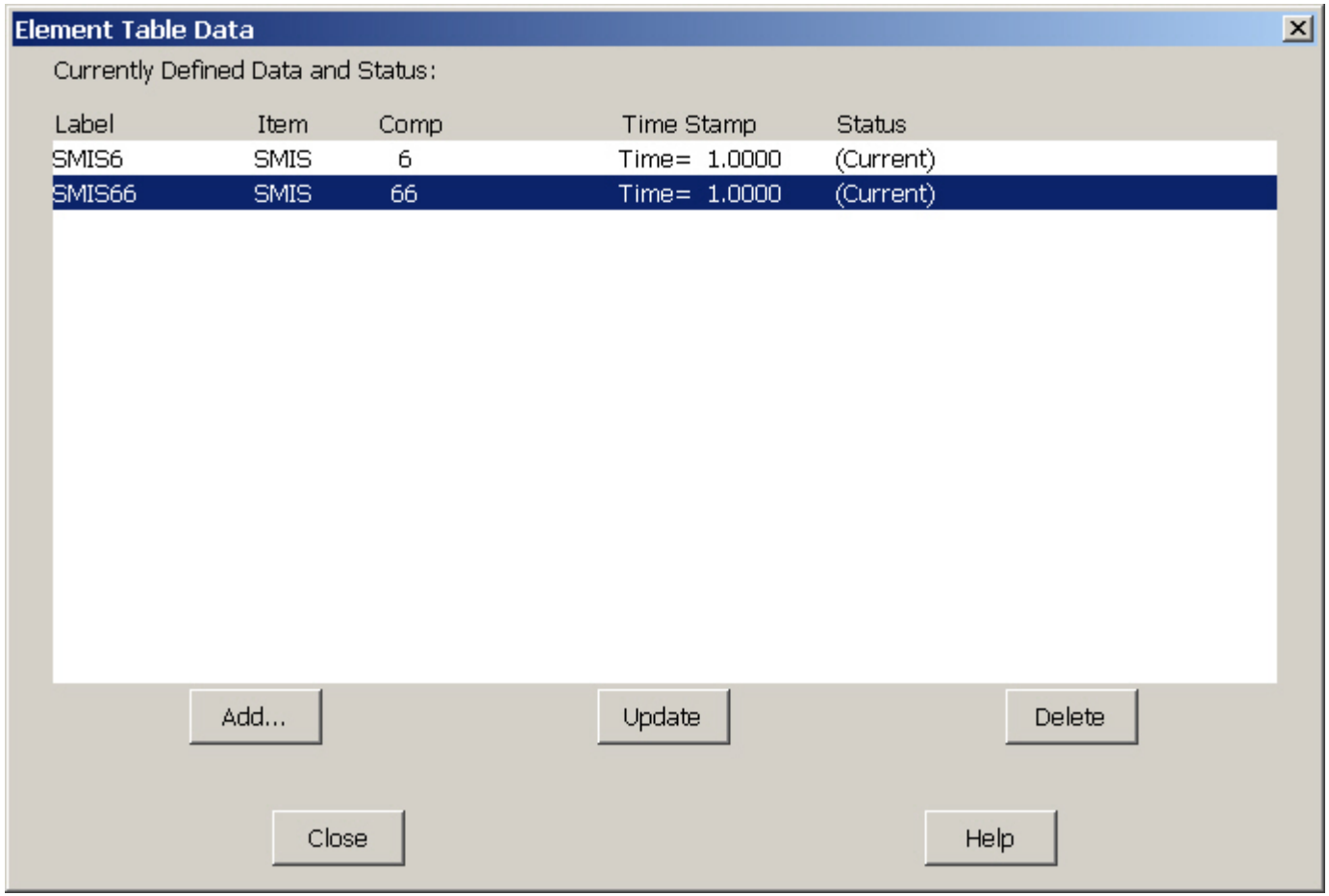


Press OK

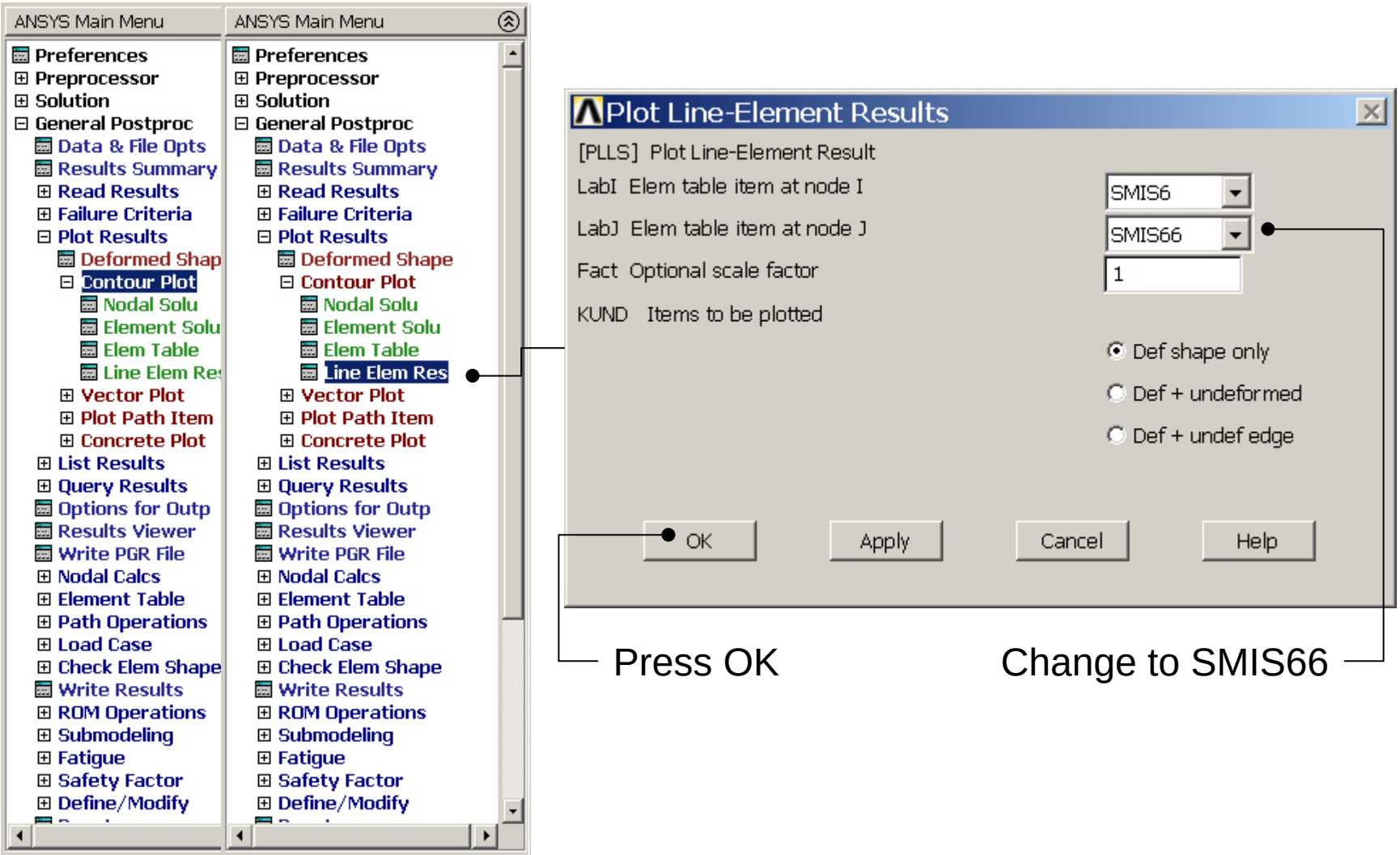
Enter 66 as found in table 3.7

From table 3.7 MMOMz, SMISC,6,66

Example – Element Table



Example – Plot Line-Element



Example – Plot Line-Element