

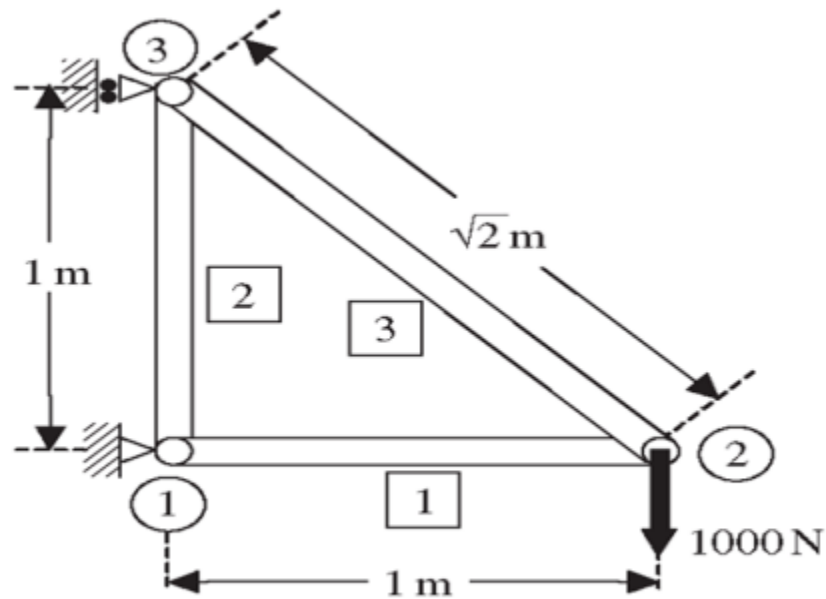
Experiment-5

CAD CAM

Problem statement:

Problem -5 (Ansys)

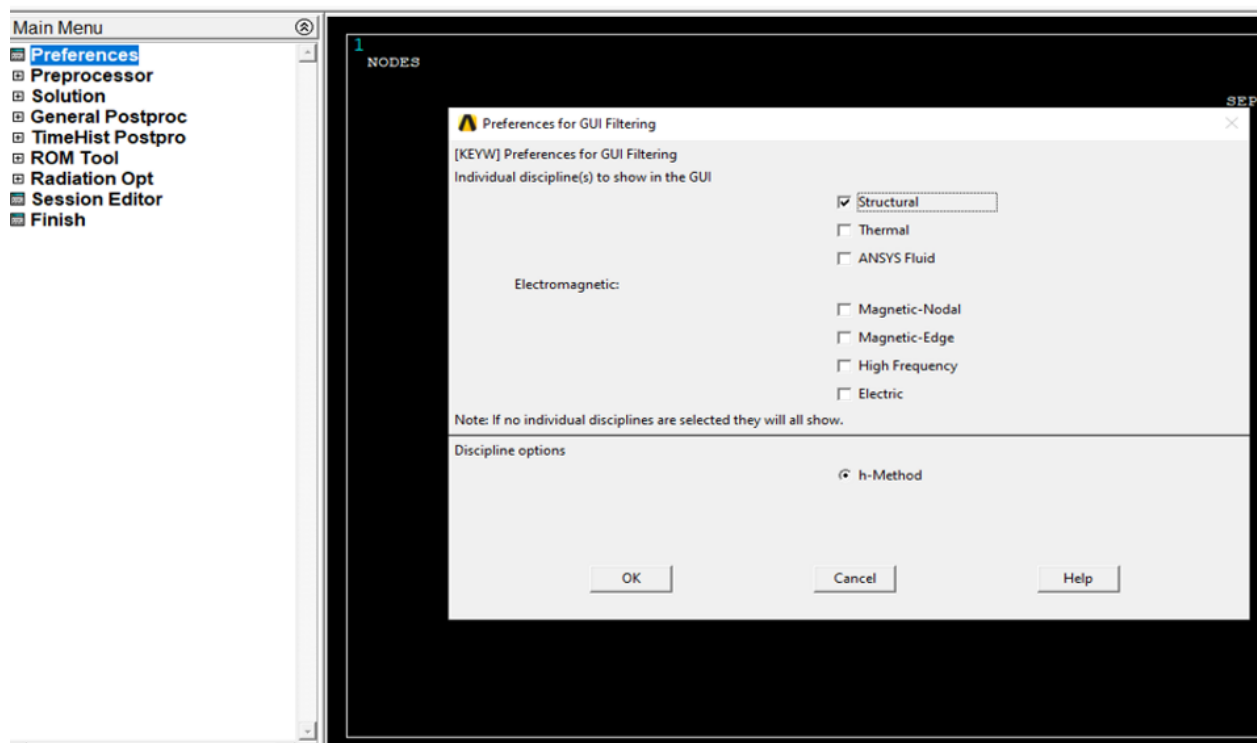
Consider the structure as shown below with dimensions. It is required to determine the deflection of each joint under the loading. Modulus of elasticity of $E = 80 \times 10^9 \text{ N/m}^2$ and a cross-sectional area of 0.12 m^2 . It is also required to calculate the average stresses in each member. Solve the problem using ANSYS (APDL).



SOLUTION:

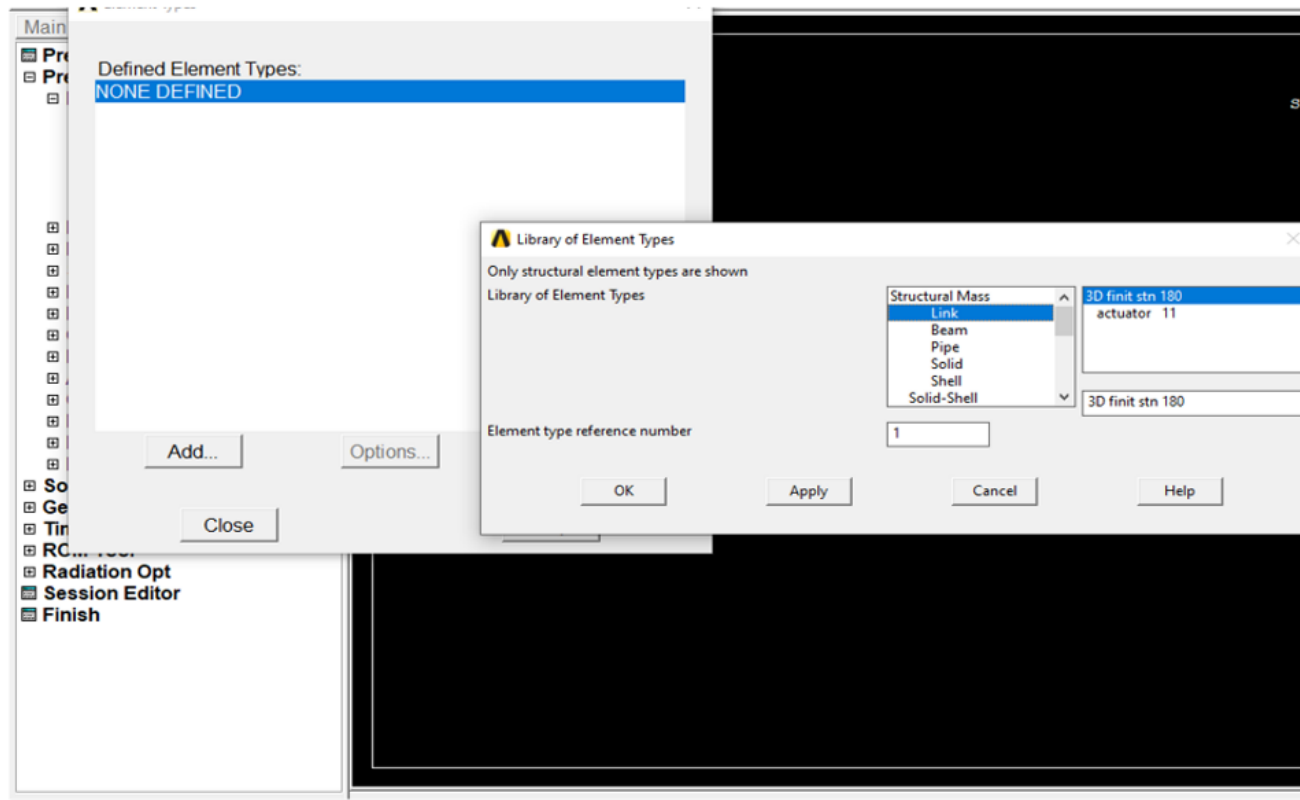
STEP-1:

The preferences option was used, which is located under the main menu, to select the type of analysis.



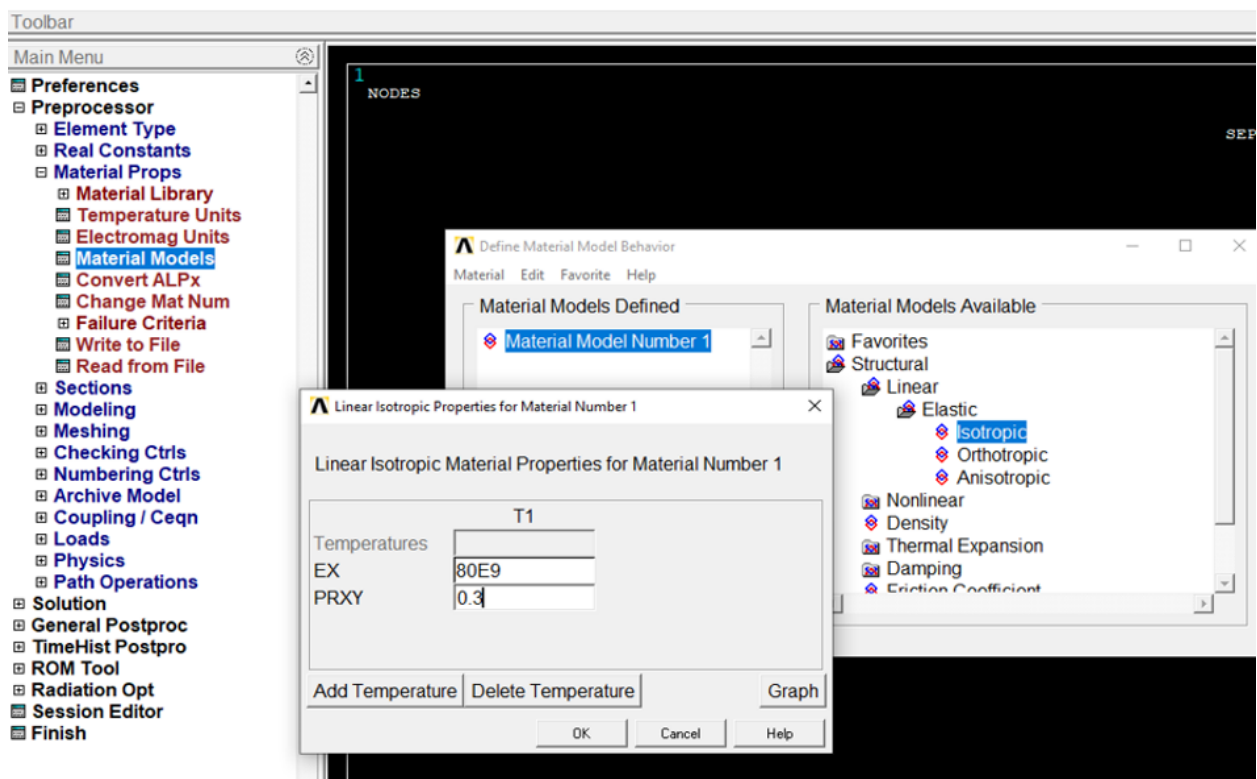
STEP-2:

The define element option was used, which was located under the preprocessor option, to define the structure type.



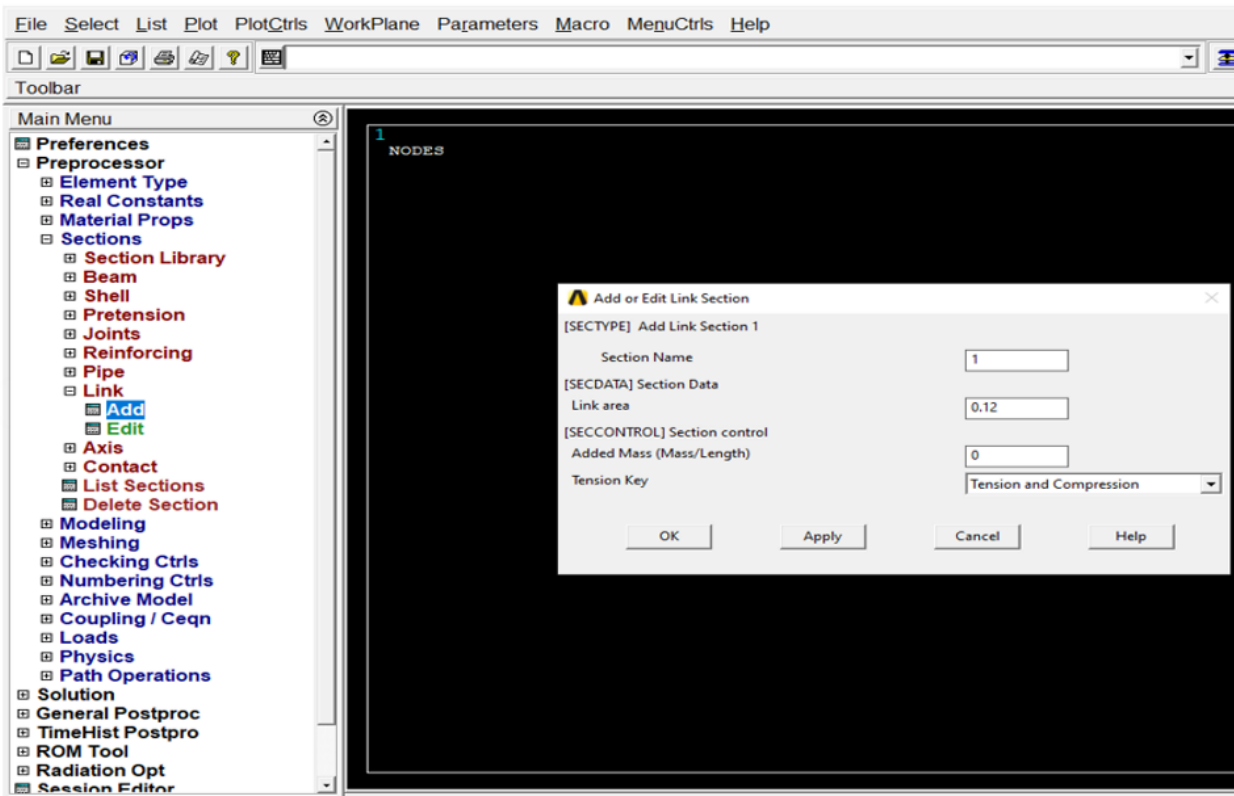
STEP-3:

The material model option was used, which was located under the material props, to define the material, Poisson's ratio, and young's modulus.



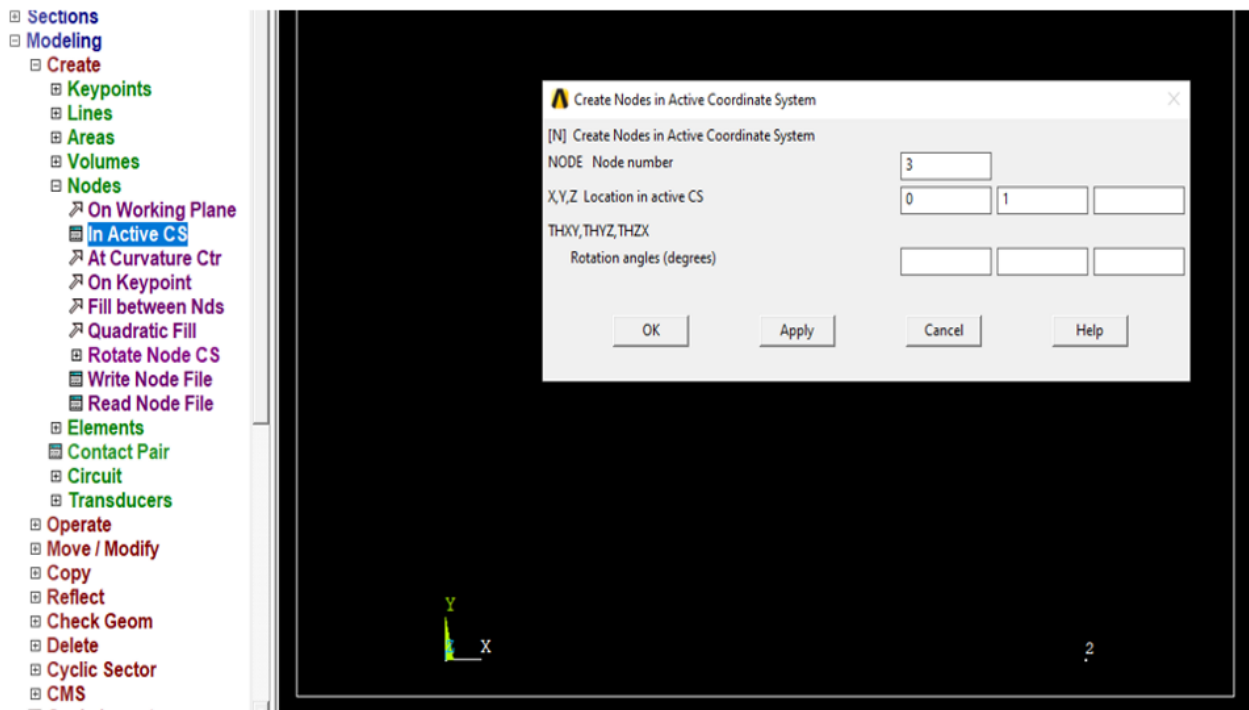
STEP-4:

The link option was used, which was located under the sections, and the link was added and cross-sectional area was defined.



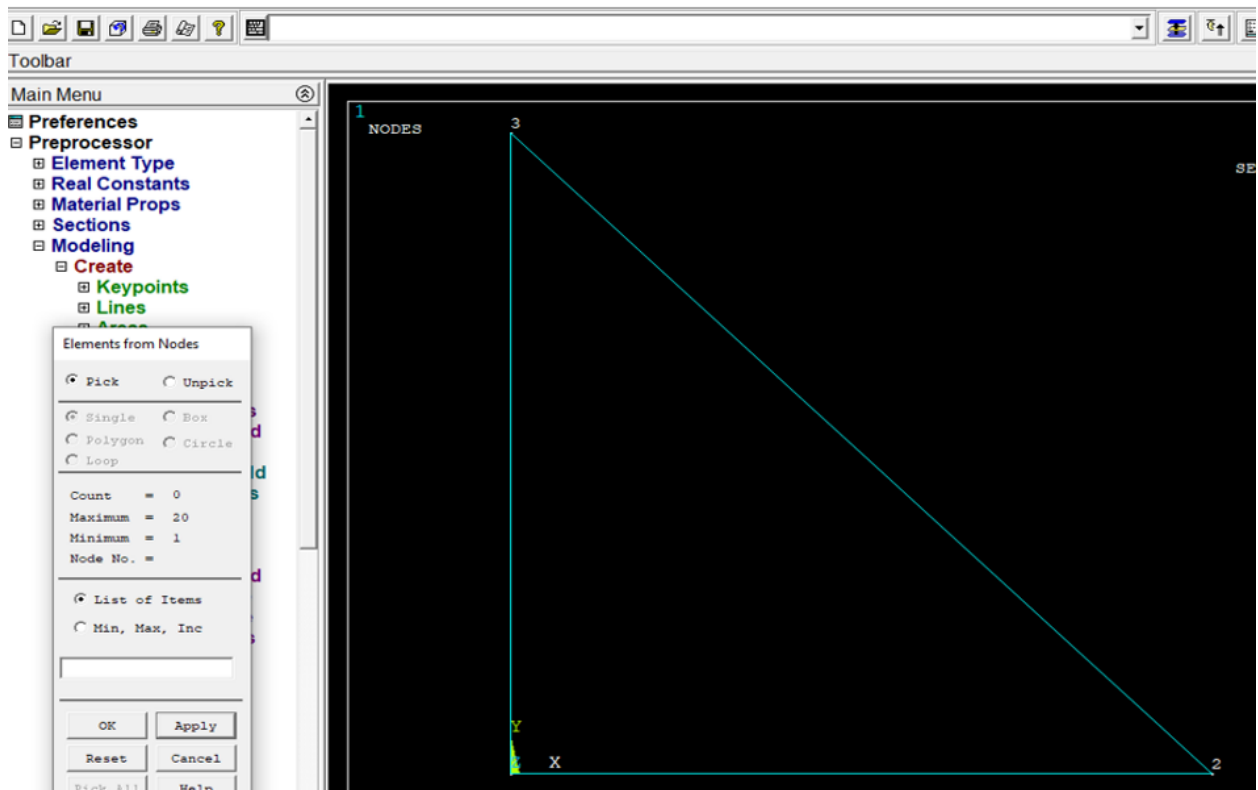
STEP-5:

The create option was used, which was located under the Modeling, to create nodes and the coordinates given in the question were used.



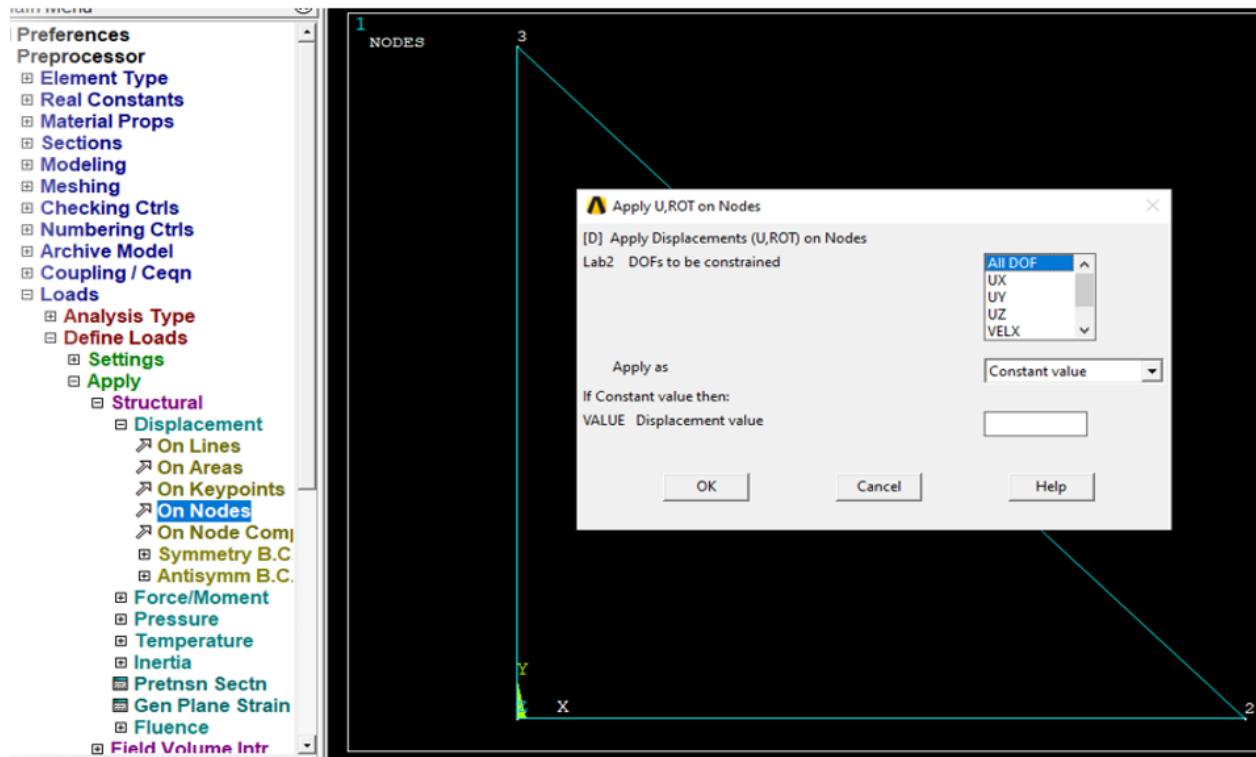
STEP-6:

The geometry was created by joining nodes and the through nodes option was used.



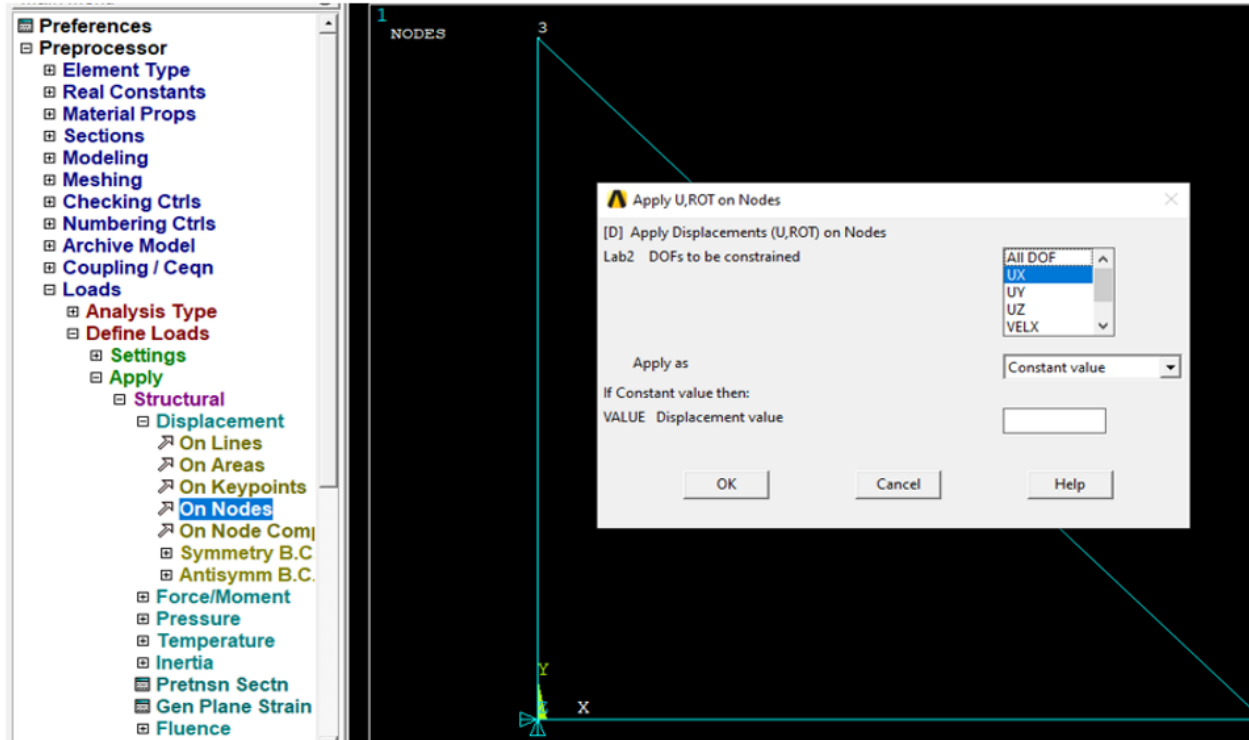
STEP-7:

Constraints were applied to Node 1 which is fixed.



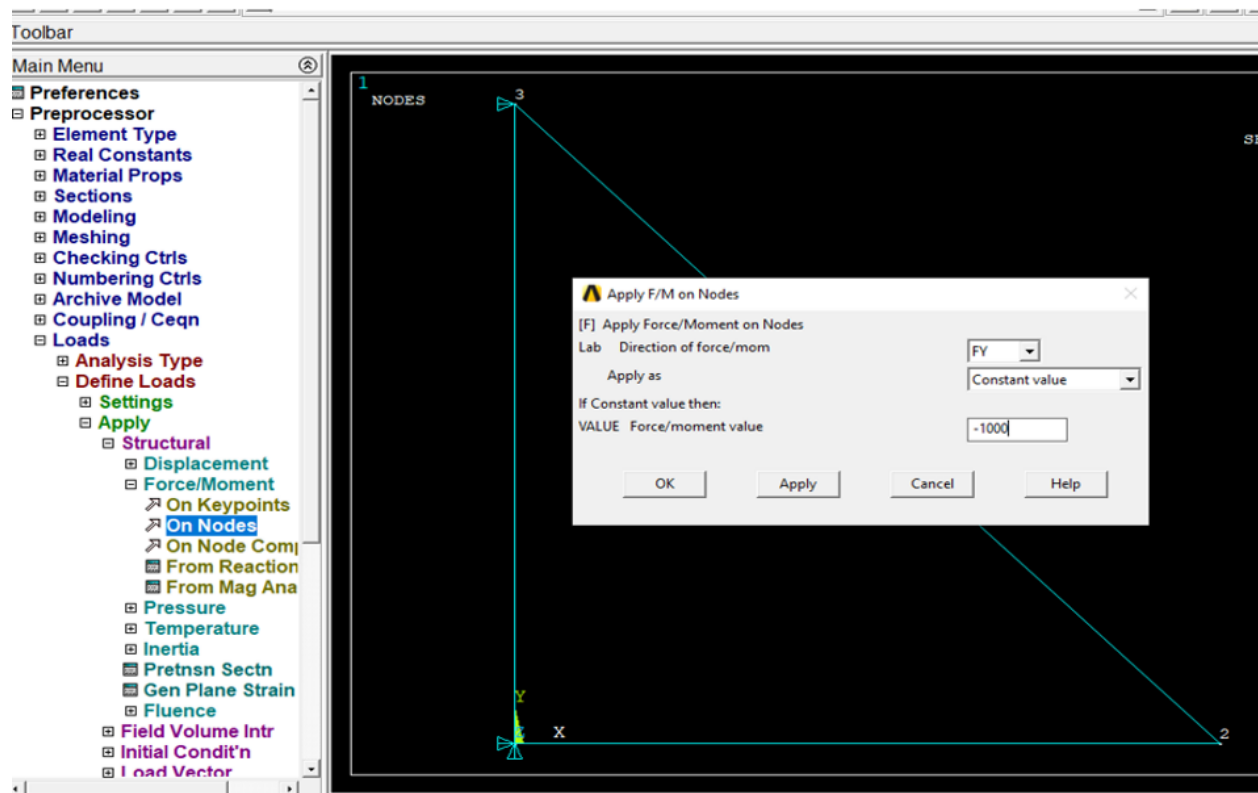
STEP-8:

Constraints were applied to node 3 which was constrained to move only in the y-direction.

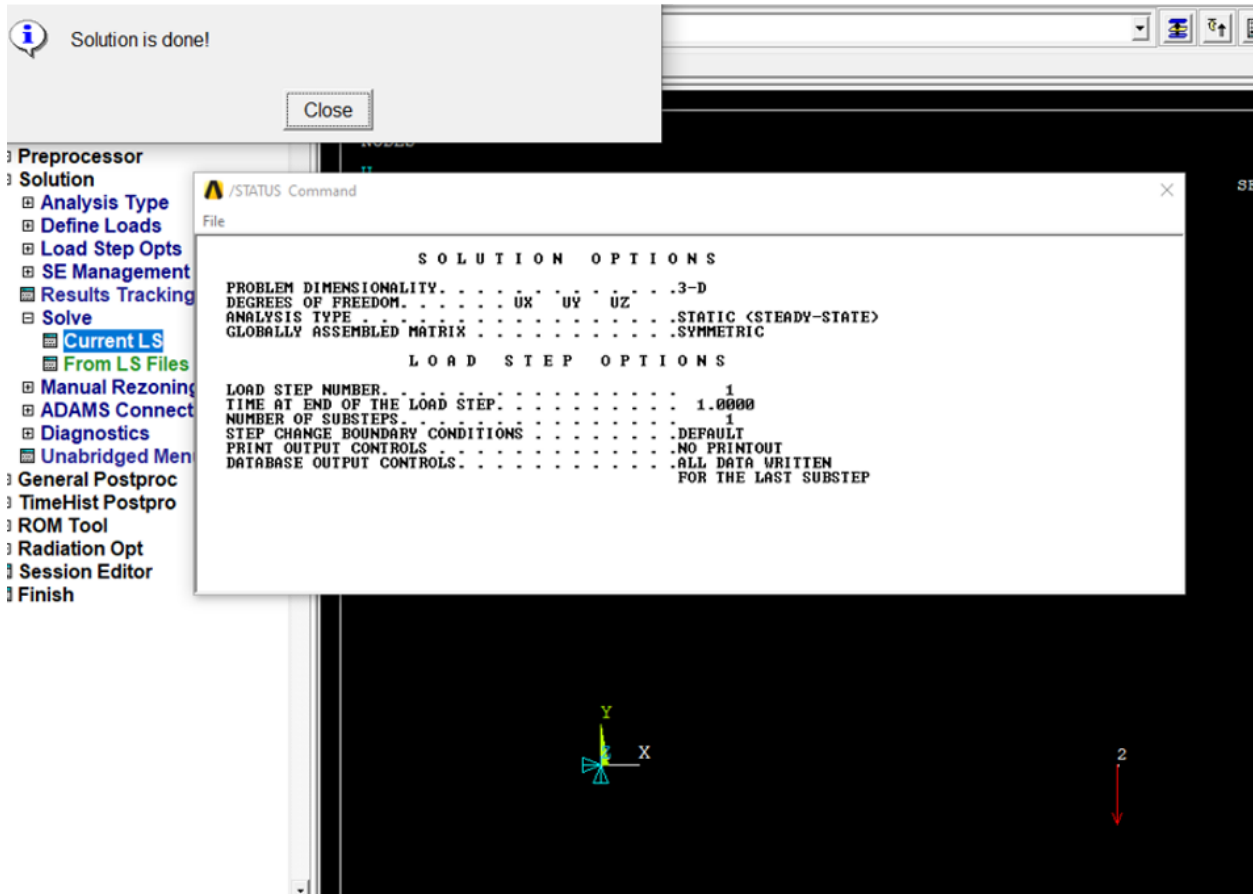


STEP-9:

Force was applied on node 2, which was free to move in all directions. The force applied in -x-direction was of magnitude 1000.

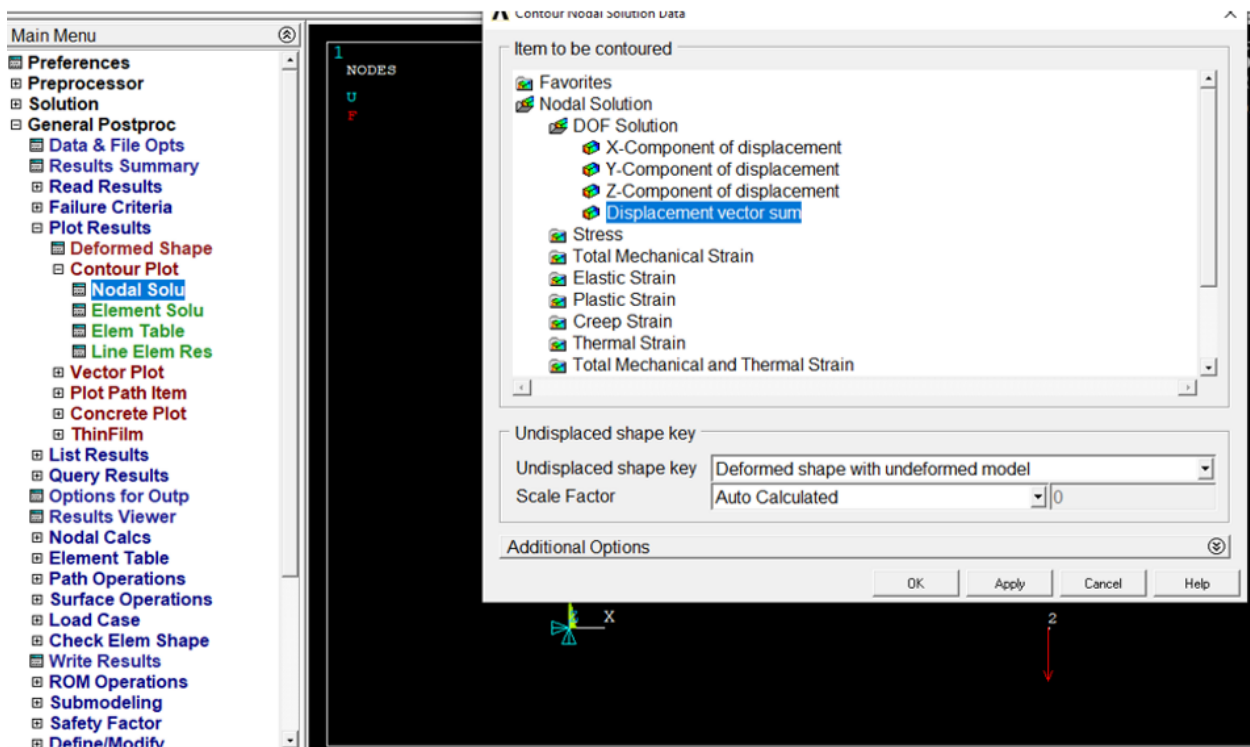


STEP-10:



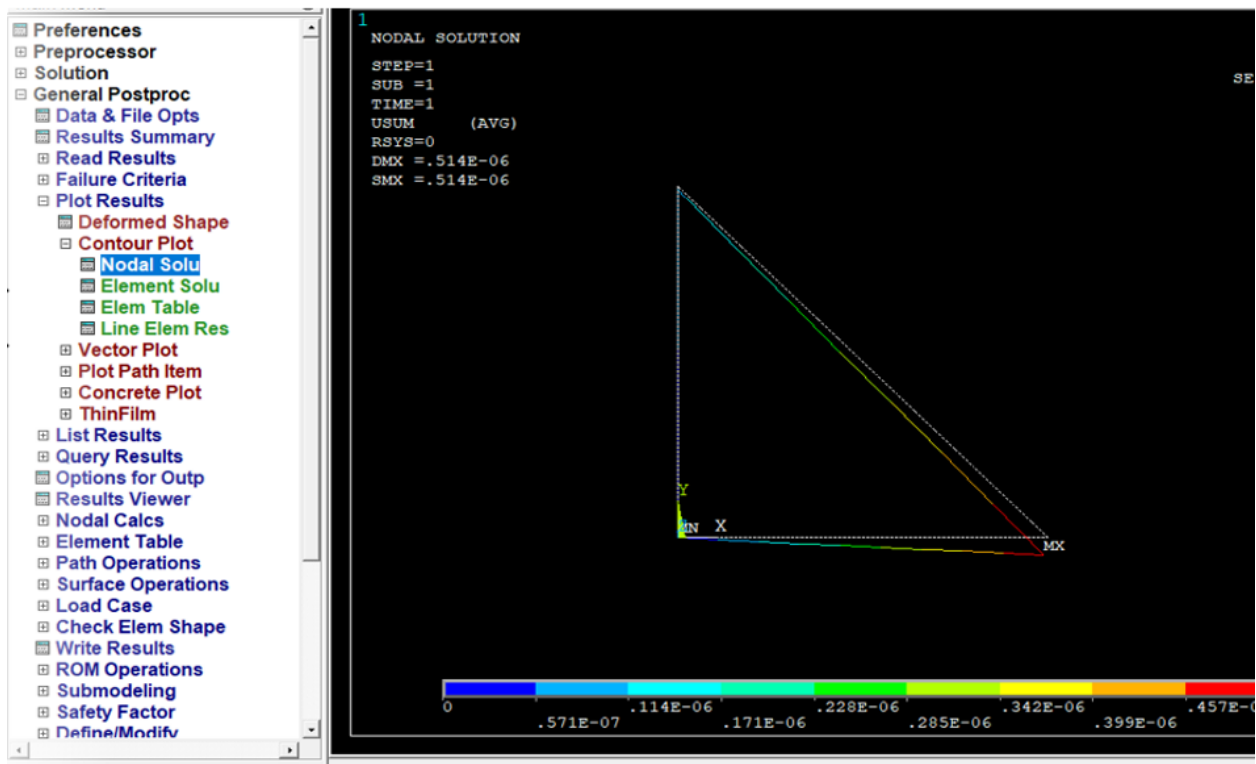
STEP-11:

The result was used to analyze the deformation in the structure due to the force applied.



STEP-12:

The result of the final analysis and the final deformation in the geometry.



PRINT U NODAL SOLUTION PER NODE

***** POST1 NODAL DEGREE OF FREEDOM LISTING *****

LOAD STEP= 1 SUBSTEP= 1
TIME= 1.0000 LOAD CASE= 0

THE FOLLOWING DEGREE OF FREEDOM RESULTS ARE IN THE GLOBAL COORDINATE SYSTEM

NODE	UX	UY	UZ	USUM
1	0.0000	0.0000	0.0000	0.0000
2	-0.10417E-006	-0.50296E-006	0.0000	0.51363E-006
3	0.0000	-0.10417E-006	0.0000	0.10417E-006

MAXIMUM ABSOLUTE VALUES

NODE	2	2	0	2
VALUE	-0.10417E-006	-0.50296E-006	0.0000	0.51363E-006

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