!HW8 – Cantilever beam

!PLANE182: 4-nodes, 2D element, 2DOF/NODE (UX,UY)

!Steel, E=29E6lb/in^2, Poisson’s ratio 0.3

!All units are inches and pound-force. Stress will be lb/in^2

FINISH !Finishes any previous activity

/CLEAR !Clears any previous activity

/BATCH !Works in “batch” mode

/PREP7

!Define Beam Geometry parameters.

!40x4x3 inch cantilever beam, 1000 pound load at 40”

LENGTH=40  
LOADPOINT=40

HEIGHT=4

THICKNESS=3

ET,1,PLANE182

MP,EX,1,29E6

MP,PRXY,1,0.3

KEYOPT,1,3,3 !Use plane stress (through the thickness)

R,1,THICKNESS !Use “THICKNESS” as the through thickness dimension

!Define locations of key points.

K,1,0,0,0

K,2,0,HEIGHT,0

K,3,LENGTH,HEIGHT,0

K,4,LENGTH,0,0

!Create lines from key points

L,1,2 !Create a line connecting Key Points 1 and 2.

L,2,3

L,3,4

L,4,1

HORIZ=0.5 !Element size across top and bottom

VERT=4 !Element size across edges

LESIZE,1,VERT

LESIZE,3,VERT

LESIZE,2,HORIZ

LESIZE,4,HORIZ

/PNUM,AREA,1

AL,ALL

AMESH,ALL

FINISH

/SOLU

!Constrain in ALL directions the nodes at left edge:

NSEL,xxx

D,xxx

!Apply force at top, at LOADPOINT from attachment:

NSEL,xxx

NSEL,xxx

F,xxx

!Since we have used NSEL to select specific nodes, we now need ALLSEL to select all of the nodes

ALLSEL

SOLVE

FINISH

/POST1

/ESHAPE,1 !Display element shapes using section data

/RGB,INDEX, 0, 0, 0,15 !set text color to black

/COLOR,WBAK,14 !Set background color to light grey

/DSCALE,ALL,1 !Plot using true scale

FINISH !Finish and exit the post-processor

SAVE !Save the data base