

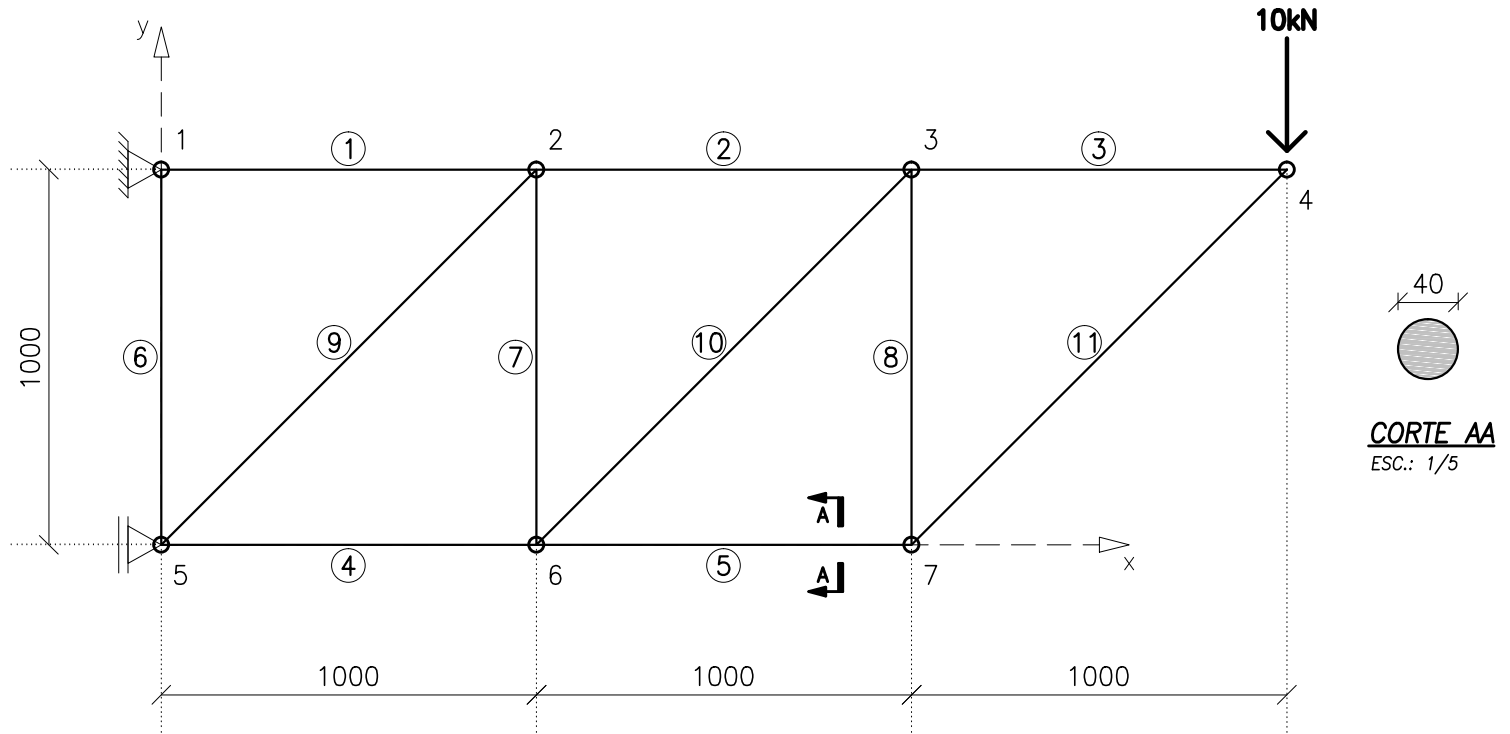
EXERCÍCIO 1.A

PROBLEMA:

DETERMINAR A FORÇA, A TENSÃO E A DEFORMAÇÃO AXIAL NAS BARRAS.
CALCULAR O DESLOCAMENTO DE TODOS OS NÓS.

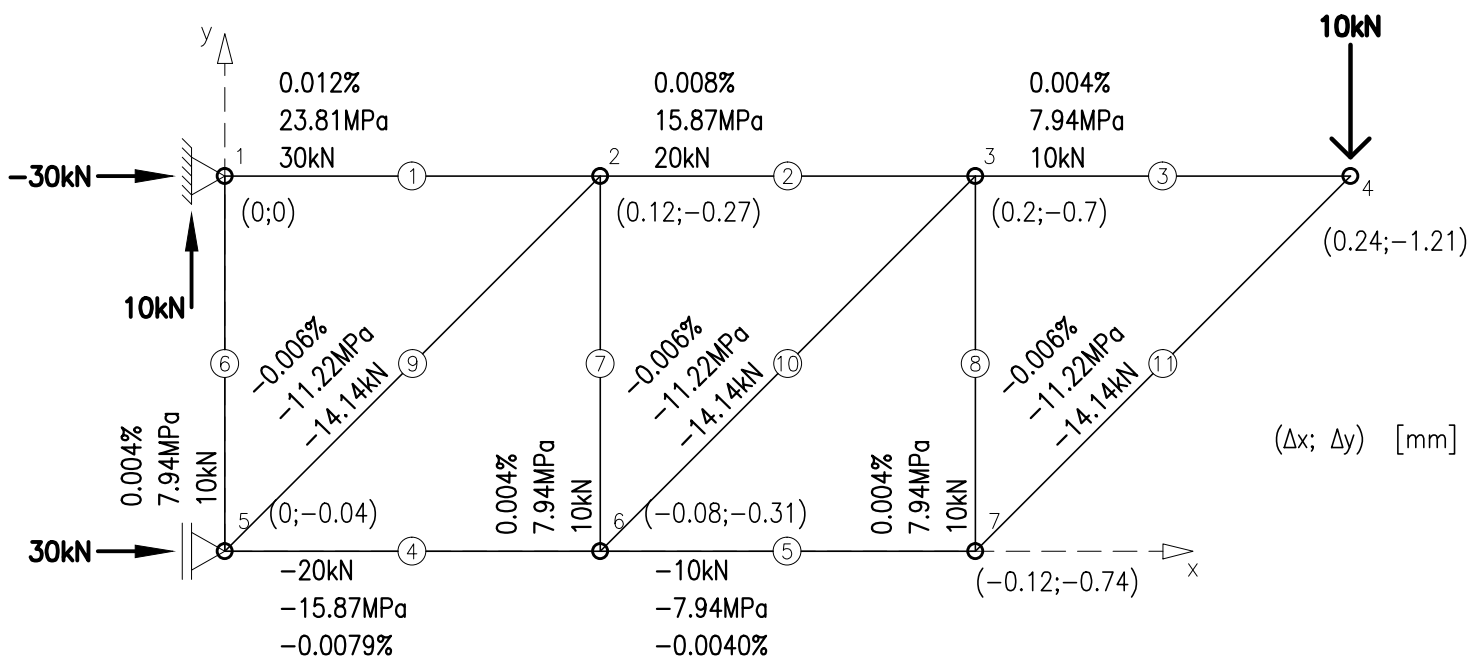
DADOS:

$E = 200\text{GPa}$
 $\nu = 0.3$



ELEVAÇÃO DA TRELIÇA

ESC.: 1/20 COTAS EM MILÍMETROS



RESULTADOS DA ANÁLISE

ESC.: 1/20 (+): TRAÇÃO | (-): COMPRESSÃO

EXERCÍCIO 1.A

Análise de uma treliça plana isostática

/prep7	Preprocessor	
ET,1,180	Element Type → Add/Edit/Delete → Add... → Library of Element Types = Structural Mass ; Link ; 3D finit stn 180 → OK → Close	
R,1,1.26E-3	Real Constants → Add/Edit/Delete → Add... → Choose element type = Type 1 LINK 180 → OK Cross-sectional area = 0.00126 → OK → Close	
MP,EX,,2E11 MP,PRXY,,0.3	Material Props → Material Models → Structural → Linear → Elastic → Isotropic → EX = 2E11 PRXY = 0.3 → OK	
N,1,0,1 N,2,1,1 N,3,2,1 N,4,3,1 N,5,0,0 N,6,1,0 N,7,2,0	Modeling → Create → Nodes → In Active CS → Node number = 1 Location in active CS = 0, 1, 0 → Apply → Node number = 2 Location in active CS = 1, 1, 0 → Apply → Node number = 3 Location in active CS = 2, 1, 0 → Apply → Node number = 4 Location in active CS = 3, 1, 0 → Apply → Node number = 5 Location in active CS = 0, 0, 0 → Apply → Node number = 6 Location in active CS = 1, 0, 0 → Apply → Node number = 7 Location in active CS = 2, 0, 0 → OK	
E,1,2 E,2,3 E,3,4 E,5,6 E,6,7 E,5,1	Modeling → Create → Elements → Auto Numbered → Thru Nodes → Clicar nos nodes 1 e 2 → Apply → Clicar nos nodes 2 e 3 → Apply → Clicar nos nodes 3 e 4 → Apply → Clicar nos nodes 5 e 6 → Apply → Clicar nos nodes 6 e 7 → Apply →	

E,6,2 E,7,3 E,5,2 E,6,3 E,7,4	<p><i>Clicar nos nodes 5 e 1</i> → Apply →</p> <p><i>Clicar nos nodes 6 e 2</i> → Apply →</p> <p><i>Clicar nos nodes 7 e 3</i> → Apply →</p> <p><i>Clicar nos nodes 5 e 2</i> → Apply →</p> <p><i>Clicar nos nodes 6 e 3</i> → Apply →</p> <p><i>Clicar nos nodes 7 e 4</i></p> <p>→ OK</p>	
D,1,UX,0,,,,UY D,5,UX,0	<p>Loads → Define Loads → Apply → Structural → Displacement → On Nodes → <i>Clicar no node 1</i> → OK →</p> <p>DOFs to be constrained = UX, UY</p> <p>→ Apply → <i>Clicar no node 5</i> → OK →</p> <p>DOFs to be constrained = UX</p> <p>→ OK</p>	
F,4,FY,-10000	<p>Loads → Define Loads → Apply → Structural → Force/Moment → On Nodes → <i>Clicar no node 4</i> → OK →</p> <p>Direction of force/mom = FY</p> <p>Force/moment value = -10000</p> <p>→ OK</p>	
/solu	Solution	
SOLVE	Solve → Current LS → OK	
/post1	General Postproc	
SET,,1	Read Results → First Set	
PLDISP	<p>Plot Results → Deformed Shape →</p> <p>Items to be plotted = Def shape only</p> <p>→ OK</p>	
PRRSOL	<p>List Results → Reaction Solu →</p> <p>Item to be listed = All items</p> <p>→ OK</p>	
PRESOL,F	List Results → Element Solution → All Available force items → OK	
ETABLE,TENSNORM,LS,1 ETABLE,DEFAXIAL,LEPEL,1 ETABLE,FORAXIAL,SMISC,1	<p>Element Table → Define Table → Add... →</p> <p>User label for item = TENSNORM</p> <p>Results data item = By sequence num ; LS, 1 → Apply →</p> <p>User label for item = DEFAXIAL</p> <p>Results data item = By sequence num ; LEPEL, 1 → Apply →</p> <p>User label for item = FORAXIAL</p> <p>Results data item = By sequence num ; SMISC, 1</p> <p>→ OK → Close</p>	

PLETAB,TENSNORM,NOAV	Plot Results → Contour Plot → Elem Table → Item to be plotted = TENSNORM → OK	
PLETAB,DEFAXIAL,NOAV	Plot Results → Contour Plot → Elem Table → Item to be plotted = DEFAXIAL → OK	
PLETAB,FORAXIAL,NOAV	Plot Results → Contour Plot → Elem Table → Item to be plotted = FORAXIAL → OK	
PRETAB,TENSNORM	List Results → Elem Table Data → Items to be listed= TENSNORM → OK	
PRETAB,DEFAXIAL	List Results → Elem Table Data → Items to be listed= DEFAXIAL → OK	
PRETAB,FORAXIAL	List Results → Elem Table Data → Items to be listed= FORAXIAL → OK	
ANMODE,50,0.02	PlotCtrls → Animate → Deformed Shape ... → No. of frames to create = 50 Time delay (seconds) = 0.02 → OK	
FINISH	Finish	

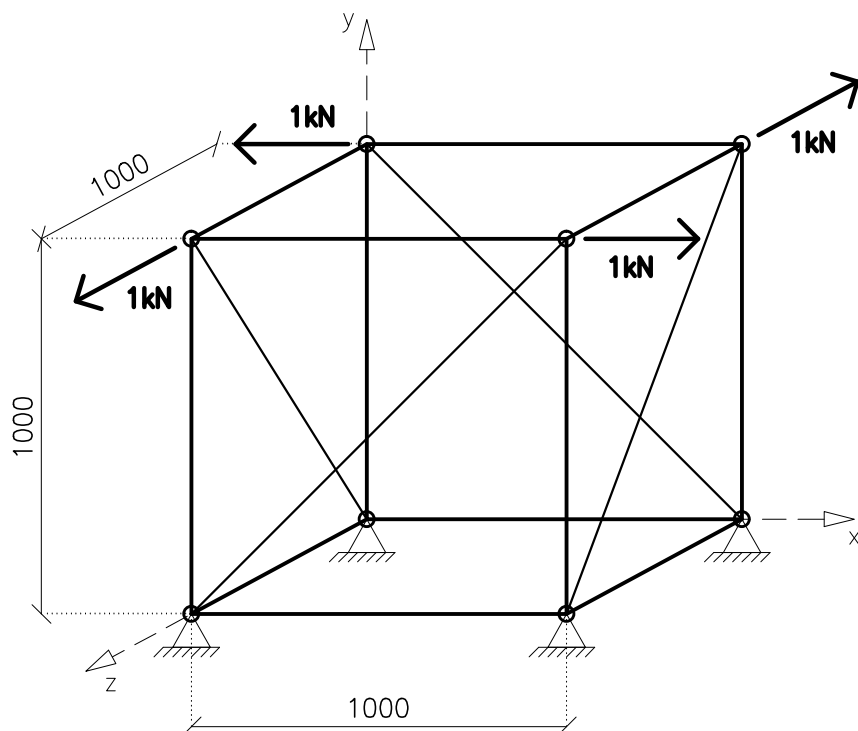
EXERCÍCIO 1.B

PROBLEMA:

DETERMINAR A FORÇA ATUANTE NAS BARRAS E O DESLOCAMENTO DOS NÓS SUPERIORES.

DADOS:

$E = 200\text{GPa}$
 $\nu = 0.3$



BANZOS/MONTANTES
ESC.: 1/5

DIAGONAIS
ESC.: 1/2

SEÇÕES TRANSVERSAIS
COTAS EM MILÍMETROS

VISTA ISOMÉTRICA DA TRELIÇA ESPACIAL

ESC.: 1/20 COTAS EM MILÍMETROS

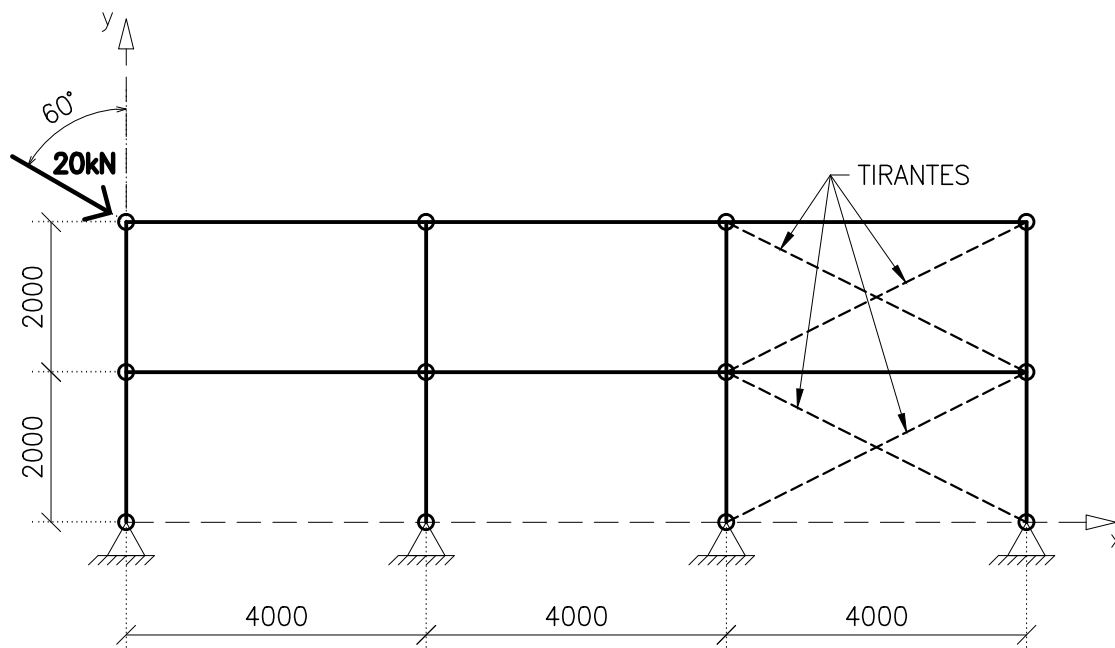
EXERCÍCIO 1.C

PROBLEMA:

DETERMINAR A FORÇA ATUANTE NAS BARRAS E O DESLOCAMENTO DOS NÓS SUPERIORES.

DADOS:

$E = 200\text{GPa}$
 $\nu = 0.3$



CONTRAVENTAMENTO
ESC.: 1/2

BARRAS DE PÓRTICO
ESC.: 1/5

ELEVAÇÃO DOS PÓRTICOS
ESC.: 1/100 COTAS EM MILÍMETROS

SEÇÕES TRANSVERSAIS
COTAS EM MILÍMETROS