

$baf()$

Nodos(x,y)

$$\begin{bmatrix} "x" \\ "y" \end{bmatrix} \begin{bmatrix} 0 & -1732 & 866.033 \\ 0 & 999.973 & 2499.93 \end{bmatrix}$$

Conectividad(ni,nf)

$$\begin{bmatrix} "ni" \\ "nf" \end{bmatrix} \begin{bmatrix} 1 & 2 \\ 2 & 3 \end{bmatrix}$$

Datos(Area,E)

$$\begin{bmatrix} "area" \\ "E" \end{bmatrix} \begin{bmatrix} 400 & 400 \\ 70000 & 70000 \end{bmatrix}$$

MR Elemento 1

$$\begin{bmatrix} 10500.3 & -6062.36 & -10500.3 & 6062.36 \\ -6062.36 & 3500.11 & 6062.36 & -3500.11 \\ -10500.3 & 6062.36 & 10500.3 & -6062.36 \\ 6062.36 & -3500.11 & -6062.36 & 3500.11 \end{bmatrix}$$

MR Elemento 2

$$\begin{bmatrix} 7000.18 & 4041.51 & -7000.18 & -4041.51 \\ 4041.51 & 2333.34 & -4041.51 & -2333.34 \\ -7000.18 & -4041.51 & 7000.18 & 4041.51 \\ -4041.51 & -2333.34 & 4041.51 & 2333.34 \end{bmatrix}$$

MR Ensamble

$$\begin{bmatrix} 10500.3 & -6062.36 & -10500.3 & 6062.36 & 0 & 0 \\ -6062.36 & 3500.11 & 6062.36 & -3500.11 & 0 & 0 \\ -10500.3 & 6062.36 & 17500.5 & -2020.85 & -7000.18 & -4041.51 \\ 6062.36 & -3500.11 & -2020.85 & 5833.45 & -4041.51 & -2333.34 \\ 0 & 0 & -7000.18 & -4041.51 & 7000.18 & 4041.51 \\ 0 & 0 & -4041.51 & -2333.34 & 4041.51 & 2333.34 \end{bmatrix}$$

Q conocidos

$$Q \text{ GDL} [1 \ 2 \ 5 \ 6]$$

$$\text{Valor } Q [0 \ 0 \ 0 \ 0]$$

F conocidos

$$F \text{ GDL} [3 \ 4]$$

$$\text{Valor } F [0 \ -20000]$$

KAA (Q con)

$$\begin{bmatrix} 17500.5 & -2020.85 \\ -2020.85 & 5833.45 \end{bmatrix}$$

KAB (Q desco)

$$\begin{bmatrix} -10500.3 & 6062.36 & -7000.18 & -4041.51 \\ 6062.36 & -3500.11 & -4041.51 & -2333.34 \end{bmatrix}$$

Q desconocidos

$$\begin{bmatrix} -0.412401 \\ -3.57137 \end{bmatrix}$$

Q solution

$$[0 \ 0 \ -0.412401 \ -3.57137 \ 0 \ 0]$$

Fext Nodos

$$[-17320.6 \ 10000.1 \ 1.E-10 \ -20000. \ 17320.6 \ 9999.93]$$

0

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Define LibPub baf()=
Prgm
©
©-----
©Sistema de Unidades SI
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©L[mm]
©Modulo E[MPa]
©Inercia[mm4]
©Area[mm2]
©Torque[N·mm]
©Fuerza[N]
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©Inercia[in4]
©Area[in2]
©Torque[lb·in]
©Fuerza[lb]
ClearAZ
©-----
©Definir variables
©-----
Local n,b,i,ni,nf,nn,nii,nff,j,h,hh,gdl1,gdl2
Local le,c,s
Local xn,yn
Local area,eyoung,largox,sigmaf
Local iner
Local ii,jj,cont,cont2
©-----
©Entrada de datos
©-----
Request "Numero Nodos",n,0
Request "Numero Barras",b,0
Request "Q conocidos",desp,0
Request "F conocidas",load,0
nn:=n* 2
©-----
©Crear memoria matrices
©-----
newMat(n,2)→nodos
newMat(b,2)→datosn
newMat(b,4)→datos
newMat(nn,nn)→mrk
newMat(4,4)→kb
newList(4)→gdl
newMat(desp,1)→mdesp1
newMat(desp,1)→mdesp2
newMat(load,1)→mload1
newMat(load,1)→mload2
newMat(nn-desp,nn-desp)→kprim

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newMat(nn-desp,desp) → kab
newMat(nn,1) → ff
newMat(nn-desp,1) → fa
newMat(nn-desp,1) → qqprima
newMat(nn-desp,1) → ffprimagauss1
newMat(nn,1) → qq
©-----
©Coordenadas Nodos(x,y)
©-----
For i,1,n
Request "(x)Pos Nodo",xn,0
Request "(y)Pos Nodo",yn,0
nodos[i,1]:=xn
nodos[i,2]:=yn
EndFor
Disp "Nodos(x,y)"
Disp ["x",nodos'
      "y"]
©-----
©Matriz conectividad y Datos
©-----
©Datos carac :Area,E,L,sigmaf
©-----
For i,1,b
Request "Nodo ni/1",nii,0
Request "Nodo nf/2",nff,0
Request "Area",area,0
Request "E",eyoung,0
datosn[i,1]:=nii
datosn[i,2]:=nff
datos[i,1]:=area
datos[i,2]:=eyoung
©datos[i,3]:=largox
©datos[i,4]:=sigmaf
EndFor
Disp "Conectividad(ni,nf)"
Disp ["ni", (subMat(datosn,1,1,b,2))'
      "nf"]
Disp "Datos(Area,E)"
Disp ["area", (subMat(datos,1,1,b,2))'
      "E"]
©-----
©Creacion Matriz Kb y Mrk
©-----
For i,1,b
nii:=datosn[i,1]
nff:=datosn[i,2]
le:=sqrt((nodos[nff,1]-nodos[nii,1])^2+(nodos[nff,2]-nodos[nii,2])^2)
c:=
$$\frac{nodos[nff,1]-nodos[nii,1]}{le}$$

s:=
$$\frac{nodos[nff,2]-nodos[nii,2]}{le}$$


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$$\frac{\text{datos}[i,1] \cdot \text{datos}[i,2]}{le} \cdot \begin{bmatrix} c^2 & c \cdot s & -1 \cdot c^2 & -s \cdot c \\ c \cdot s & s^2 & -s \cdot c & -s^2 \\ -c^2 & -s \cdot c & c^2 & s \cdot c \\ -s \cdot c & -s^2 & s \cdot c & s^2 \end{bmatrix} \rightarrow kb$$

```

Disp "MR Elemento",i
Disp kb
gdl[1]:=2·nii-1
gdl[2]:=2·nii
gdl[3]:=2·nff-1
gdl[4]:=2·nff
For hh,1,4
  For j,1,4
    gdl1:=gdl[hh]
    gdl2:=gdl[j]
    mrk[gdl1,gdl2]:=kb[hh,j]+mrk[gdl1,gdl2]
  EndFor
EndFor
EndFor
Disp "MR Ensamble"
Disp mrk
©-----
©Cond.Despla.Q
©-----
For i,1,desp
  Request "Q GDL",mdesp1[i,1],0
  Request "Valor Q",mdesp2[i,1],0
EndFor
Disp "Q conocidos"
Disp "Q GDL",mdesp1^
Disp "Valor Q",mdesp2^
©-----
©Cond.Despla.F
©-----
For i,1,load
  Request "F GDL",mload1[i,1],0
  Request "Valor F",mload2[i,1],0
EndFor
Disp "F conocidos"
Disp "F GDL",mload1^
Disp "Valor F",mload2^
©-----
©Kaa (Q conocidos)
©-----
i:=1
j:=1
ii:=1
jj:=1
While j≤nn
  cont:=0
  For h,1,desp
    If mdesp1[h,1]=i or mdesp1[h,1]=j Then
      cont:=cont+1
      If i=j Then
        cont:=cont+1

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EndIf
EndIf
EndFor
If cont=0 Then
  kprim[ii,jj]:=mrk[i,j]
  jj:=jj+1
  If jj>nn-desp Then
    ii:=ii+1
    jj:=1
  EndIf
EndIf
EndIf
j:=j+1
If j=nn+1 Then
  j:=1
  i:=i+1
EndIf
If i=nn+1 Then
  j:=nn+1
EndIf
EndWhile
Disp "KAA (Q con)"
Disp kprim
©-----
©Kab (Q desconocidos)
©-----
i:=1
j:=1
ii:=1
jj:=1
While j≤nn
  cont:=0
  For h,1,desp
    If mdesp1[h,1]=i or mdesp1[h,1]=j Then
      cont:=cont+1
      If i=j Then
        cont:=cont+1
      EndIf
    EndIf
  EndFor
  cont2:=0
  For h,1,desp
    If mdesp1[h,1]=i Then
      cont2:=cont2+1
    EndIf
  EndFor
  If cont=1 and cont2=0 Then
    kab[ii,jj]:=mrk[i,j]
    jj:=jj+1
    If jj>desp Then
      ii:=ii+1
      jj:=1
    EndIf
  EndIf
EndIf
EndIf
j:=j+1
If j=nn+1 Then
  j:=1

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```

    i:=i+1
EndIf
If i=nn+1 Then
    j:=nn+1
EndIf
EndWhile
Disp "KAB (Q desco)"
Disp kab
©-----
©Matrix Fext
©-----
For i,1,nn
    ff[i,1]:=0
EndFor
For i,1,load
    ff[mload1[i,1],1]:=mload2[i,1]
EndFor
©-----
©M Fext conocidas
©-----
For i,1,nn-desp
    fa[i,1]:=0
EndFor
ii:=1
For i,1,nn
    cont2:=0
    For h,1,desp
        If mdesp1[h,1]=i Then
            cont2:=cont2+1
        EndIf
    EndFor
    If cont2=0 Then
        fa[ii,1]:=ff[i,1]
        ii:=ii+1
    EndIf
EndFor
©-----
©Solucionar Q desconocidos
©-----
ffprimagauss1:=kab·mdesp2
For i,1,nn-desp
    ffprimagauss1[i,1]:=fa[i,1]-ffprimagauss1[i,1]
EndFor
For i,1,nn-desp
    If kprim[i,i]=0 Then
        kprim[i,i]:=1.E-7
    EndIf
EndFor
qqprima:=kprim-1·ffprimagauss1
Disp "Q desconocidos"
Disp qqprima
©-----
©Crear M.Q.desp
©-----
For i,1,nn
    qq[i,1]:=0

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EndFor
For  $i, 1, desp$ 
   $qq[mdesp1[i, 1], 1] := mdesp2[i, 1]$ 
EndFor
 $ii := 1$ 
For  $i, 1, nn$ 
   $cont := 0$ 
  For  $h, 1, desp$ 
    If  $mdesp1[h, 1] = i$  Then
       $cont := cont + 1$ 
    EndIf
  EndFor
  If  $cont = 0$  Then
     $qq[i, 1] := qqprima[ii, 1]$ 
     $ii := ii + 1$ 
  EndIf
EndFor
Disp "Q solution"
Disp  $qq'$ 
©-----
©Solucion Fext Nodos
©-----
 $mrk \cdot qq \rightarrow ff$ 
Disp "Fext Nodos"
Disp  $ff'$ 
EndPrgm

```


Press menu