

Algoritmus příkazů

/finish

/prep7

*AFUN,DEG

allsell,all

*GET,pocet_uzlu,NODE,,COUNT, , , ,

*GET,pocet_elem,ELEM,,COUNT, , , ,

*DIM,poloha_nodu,ARRAY,pocet_uzlu,4,1, , ,

*DIM,teziste_ELEM,ARRAY,pocet_elem,5,1, , ,

*GET,e_no,node,0,NXTH

*do,i,1,pocet_uzlu,1

 poloha_nodu(e_no,1)=e_no

 *GET,poloha_nodu(e_no,2),NODE,e_no,LOC,x,

 *GET,poloha_nodu(e_no,3),NODE,e_no,LOC,y,

 *GET,poloha_nodu(e_no,4),NODE,e_no,LOC,z,

 *GET,e_no,node,e_no,NXTH

*enddo

*GET,e_el,elem,0,NXTH

*do,i,1,pocet_elem,1

 *SET,teziste_ELEM(e_el,1),e_el

 *GET,teziste_ELEM(e_el,2),ELEM,e_el,CENT,X

 *GET,teziste_ELEM(e_el,3),ELEM,e_el,CENT,Y

 *GET,teziste_ELEM(e_el,4),ELEM,e_el,CENT,Z

 *GET,e_el,elem,e_el,NXTH

*enddo

*DIM,Y_val,ARRAY,pocet_elem,1

*do,q,1,pocet_elem

 Y_val(q,1)=teziste_ELEM(q,3)

*enddo

*VSCFUN,y_min,MIN,Y_val

*VSCFUN,y_max,MAX,Y_val

delka=y_max-y_min

```
pocet=arg1
oblast=delka/pocet
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*DIM,suma,ARRAY,pocet,4,1, , ,
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```
suma(1,1)=0
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suma(1,2)=0
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suma(1,3)=0
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suma(1,4)=0
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*do,i,1,pocet_elem,1
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```
    *do,j,1,pocet-1,1
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```
        *if,teziste_ELEM(i,3),ge,y_min+oblast*(j-1),AND,teziste_ELEM(i,3),lt,y_min+oblast*(j),then
```

```
            suma(j,1)=suma(j,1)+teziste_ELEM(i,2)
```

```
            suma(j,2)=suma(j,2)+teziste_ELEM(i,3)
```

```
            suma(j,3)=suma(j,3)+teziste_ELEM(i,4)
```

```
            suma(j,4)=suma(j,4)+1
```

```
            *SET,teziste_ELEM(i,5),j
```

```
        *endif
```

```
    *enddo
```

```
    *if,teziste_ELEM(i,3),ge,y_min+oblast*(pocet-1),AND,teziste_ELEM(i,3),le,y_min+oblast*(pocet),then
```

```
        suma(pocet,1)=suma(pocet,1)+teziste_ELEM(i,2)
```

```
        suma(pocet,2)=suma(pocet,2)+teziste_ELEM(i,3)
```

```
        suma(pocet,3)=suma(pocet,3)+teziste_ELEM(i,4)
```

```
        suma(pocet,4)=suma(pocet,4)+1
```

```
        *SET,teziste_ELEM(i,5),pocet
```

```
    *endif
```

```
*enddo
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```
*DIM,osa,ARRAY,pocet,3,1, , ,
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```
*DIM,b,ARRAY,3,1,1, , ,
```

```
*do,k,1,pocet,1
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    *SET,osa(k,1),suma(k,1)/suma(k,4)
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```
    *SET,osa(k,2),suma(k,2)/suma(k,4)
```

```
    *SET,osa(k,3),suma(k,3)/suma(k,4)
```

```
*enddo
```

```
*do,k,1,3,1
```

```
    *SET,b(k,1,1),-1
```

```
*enddo
```

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*DIM,Xvsech,ARRAY,pocet_elem,3,1, , ,
*DIM,matA,ARRAY,3,3,1, , ,
*DIM,vecAB,ARRAY,1,3,1, , ,
*DIM,vecAC,ARRAY,1,3,1, , ,
*DIM,matA_T,ARRAY,3,3,1, , ,
*DIM,matA_TmatA,ARRAY,3,3,1, , ,
*DIM,inverA,ARRAY,3,3,1, , ,
*DIM,invAxA_T,ARRAY,3,3,1,,
*DIM,X,ARRAY,3,1,1,,
*DIM,Xjed,ARRAY,3,1,1,,
*DIM,smer,ARRAY,1,3,1,,

*do,i,1,pocet_elem,1
  CMSEL,R,vnejsi,node
  vybr_nod=node(teziste_ELEM(i,2),teziste_ELEM(i,3),teziste_ELEM(i,4))

  matA(1,1)=poloha_nodu(vybr_nod,2)
  matA(1,2)=poloha_nodu(vybr_nod,3)
  matA(1,3)=poloha_nodu(vybr_nod,4)

  NSEL,U,NODE,,vybr_nod

  blizky_nod1=node(teziste_ELEM(i,2),teziste_ELEM(i,3),teziste_ELEM(i,4))
  matA(2,1)=poloha_nodu(blizky_nod1,2)
  matA(2,2)=poloha_nodu(blizky_nod1,3)
  matA(2,3)=poloha_nodu(blizky_nod1,4)

  NSEL,U,NODE,,blizky_nod1

  vecAB(1,1)=matA(2,1)-matA(1,1)
  vecAB(1,2)=matA(2,2)-matA(1,2)
  vecAB(1,3)=matA(2,3)-matA(1,3)

  AB=(vecAB(1,1)**(2)+vecAB(1,2)**(2)+vecAB(1,3)**(2))**(1/2)

  uhel=1
  *dowhile,uhel
    blizky_nod2=node(teziste_ELEM(i,2),teziste_ELEM(i,3),teziste_ELEM(i,4))
    matA(3,1)=poloha_nodu(blizky_nod2,2)
    matA(3,2)=poloha_nodu(blizky_nod2,3)
    matA(3,3)=poloha_nodu(blizky_nod2,4)

    vecAC(1,1)=matA(3,1)-matA(1,1)

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vecAC(1,2)=matA(3,2)-matA(1,2)
vecAC(1,3)=matA(3,3)-matA(1,3)

AC=(vecAC(1,1)**(2)+vecAC(1,2)**(2)+vecAC(1,3)**(2))**(1/2)

*VOPER,vecABAC,vecAB,Dot,vecAC
ABAC=vecABAC(1,1)
cosin=ABAC/(AB*AC)

*if,cosin,ge,cos(5),or,cosin,le,-cos(5),then
    NSEL,U,NODE,,blizky_nod2
*else
    uhel=0
*endif
*enddo

*if,matA(1,1),eq,matA(2,1),and,matA(2,1),eq,matA(3,1),then
    *do,n,1,3,1
        *SET,smer(1,n),osa(teziste_ELEM(i,5),n)-teziste_ELEM(i,n+1)
    *enddo

    smer_uhel=(smer(1,1))/(smer(1,1)**2+ smer(1,2)**2+ smer(1,3)**2)**(1/2)

    *if,smer_uhel,lt,0,then
        Xvsech(i,1)=-1
    *else
        Xvsech(i,1)=1
    *endif
*endif

*if,matA(1,2),eq,matA(2,2),and,matA(2,2),eq,matA(3,2),then
    Xvsech(i,2)=1
*endif

*if,matA(1,3),eq,matA(2,3),and,matA(2,3),eq,matA(3,3),then
    *do,n,1,3,1
        *SET,smer(1,n),osa(teziste_ELEM(i,5),n)-teziste_ELEM(i,n+1)
    *enddo

    smer_uhel=(smer(1,3))/(smer(1,1)**2+ smer(1,2)**2+ smer(1,3)**2)**(1/2)

    *if,smer_uhel,lt,0,then
        Xvsech(i,3)=-1
    *else

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                Xvsech(i,3)=1
            *endif
    *endif

    *if,Xvsech(i,1),eq,0,and,Xvsech(i,2),eq,0,then
        *if,Xvsech(i,3),eq,0,then
            *MFUN,matA_T,TRAN,matA

            *MOPER,matA_TmatA,matA_T,MULT,matA

            *MOPER,inverA,matA_TmatA,invert

            *MOPER,invAxA_T,inverA,MULT,matA_T

            *MOPER,X,invAxA_T,MULT,b

            _X_=(X(1)**2+X(2)**2+X(3)**2)**(1/2)

            *do,m,1,3,1
                *SET,Xjed(m,1),X(m,1)/_X_
            *enddo
            *do,n,1,3,1
                *SET,smer(1,n),osa(teziste_ELEM(i,5),n)-teziste_ELEM(i,n+1)
            *enddo

            smer_uhel=(smer(1,1)* Xjed(1,1)+smer(1,2)* Xjed(2,1)+ smer(1,3)*
            Xjed(3,1))/(smer(1,1)**2+ smer(1,2)**2+ smer(1,3)**2)**(1/2)

            *if,smer_uhel,lt,0,then
                *do,m,1,3,1
                    *SET,Xjed(m,1),Xjed(m,1)*(-1)
                *enddo
            *endif

            *do,c,1,3,1
                *SET,Xvsech(i,c,1),Xjed(c,1)
            *enddo
        *endif
    *endif

    allsell,all
    *enddo

    *DIM,Yo,ARRAY,pocet,3,1, , ,
    *DIM,rovina,ARRAY,1,3,1, , ,

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*DIM,vecN,ARRAY,1,3,1, , ,
*DIM,vecR,ARRAY,1,3,1, , ,
*DIM,matC,ARRAY,2,2,1, , ,
*DIM,matD,ARRAY,2,1,1, , ,
*DIM,vecA,ARRAY,2,1,1, , ,
*DIM,inverC,ARRAY,2,2,,
*DIM,Y,ARRAY,1,3,1, , ,
*DIM,Yjed,ARRAY,1,3,1, , ,
*DIM,Yvsech,ARRAY,pocet_ELEM,3,1, , ,

*do,m,1,pocet-1,1
    *SET,Yo(m,1),osa(m+1,1)-osa(m,1)
    *SET,Yo(m,2),osa(m+1,2)-osa(m,2)
    *SET,Yo(m,3),osa(m+1,3)-osa(m,3)
*enddo

*SET,Yo(pocet,2),1

*do,p,1,pocet_elem,1
    *do,q,1,pocet,1
        *if,teziste_ELEM(p,5),eq,q,then
            *SET,vecN(1,1),Xvsech(p,1)
            *SET,vecN(1,2),Xvsech(p,2)
            *SET,vecN(1,3),Xvsech(p,3)

            *SET,vecR(1,1),Yo(q,1)
            *SET,vecR(1,2),Yo(q,2)
            *SET,vecR(1,3),Yo(q,3)

            *VOPER,rovina,vecN,CROSS,vecR

            d_1=(vecN(1,1)*teziste_ELEM(p,2)+vecN(1,2)*teziste_ELEM(p,3)+vecN(1,3)*tezi
            ste_ELEM(p,4))
            d_2=(rovina(1,1)*teziste_ELEM(p,2)+rovina(1,2)*teziste_ELEM(p,3)+rovina(1,3)*te
            ziste_ELEM(p,4))

            *SET,matD(1,1),d_1-vecN(1,2)*(-1+y_min*q)
            *SET,matD(2,1),d_2-rovina(1,2)*(-1+y_min*q)
            *SET,matC(1,1),vecN(1,1)
            *SET,matC(1,2),vecN(1,3)
            *SET,matC(2,1),rovina(1,1)
            *SET,matC(2,2),rovina(1,3)
            *MOPER,inverC,matC,invert
            *MOPER,vecA,inverC,MULT,matD

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*SET,Y(1,1),teziste_ELEM(p,2)-vecA(1,1)
*SET,Y(1,2),teziste_ELEM(p,3)-(-1+y_min*q)
*SET,Y(1,3),teziste_ELEM(p,4)-vecA(2,1)

_Y_=(Y(1,1)**2+Y(1,2)**2+Y(1,3)**2)**(1/2)

*do,o,1,3,1
    *SET,Yjed(1,o),Y(1,o)/_Y_
    *SET,Yvsech(p,o,1),Yjed(1,o)
*enddo
*endif
*enddo
*enddo

*do,i,1,pocet_elem,1
    csys,0
    K,i*100,teziste_ELEM(i,2),teziste_ELEM(i,3),teziste_ELEM(i,4)
    K,i*100+1,teziste_ELEM(i,2)+Xvsech(i,1),teziste_ELEM(i,3)+Xvsech(i,2),teziste_EL
EM(i,4)+Xvsech(i,3)
    K,i*100+2,teziste_ELEM(i,2)+Yvsech(i,1),teziste_ELEM(i,3)+Yvsech(i,2),teziste_EL
EM(i,4)+Yvsech(i,3)

    CSKP,100+i,0,i*100,i*100+1,i*100+2
*enddo
*do,i,1,pocet_elem,1
    EMODIF,i,ESYS,100+i
*enddo
csys,0
/finish
/sol

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