

pst-solides3d : variations autour d'un cylindre

3 juillet 2008

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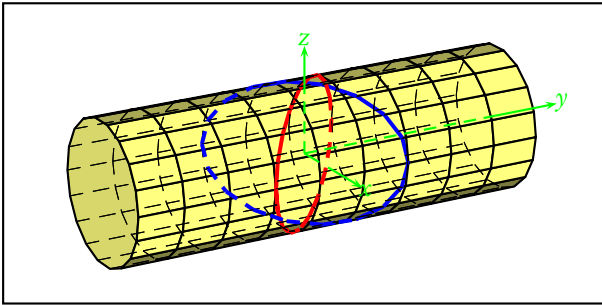
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1 Intersection de deux cylindres

Le but est de représenter l'intersection de deux cylindres identiques dont les axes sont perpendiculaires. Le solide de départ est un cylindre sur lequel on va réaliser différentes opérations.

1.1 Taillage d'une extrémité du cylindre en biseau

On coupe le cylindre en son milieu par deux plans faisant un angle de $\pm 45^\circ$ avec l'axe.
Dessignons, d'abord les traces des plans de coupe sur le cylindre :

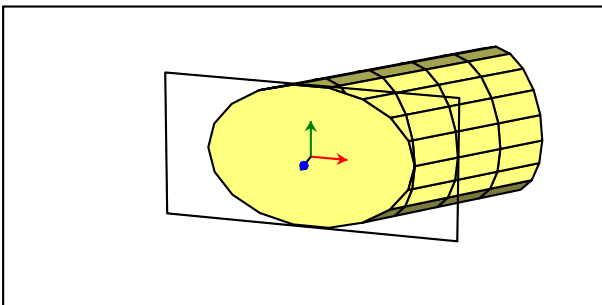


```

1 \begin{pspicture}(-4,-2)(4,2)
2 \psframe(-4,-2)(4,2)
3 \psset{lightsrc=viewpoint,SphericalCoord,viewpoint=100
4   -30 20,Decran=50}
5 \psSolid[object=cylindre,
6   ngrid=9 18,
7   r=2,h=12,
8   RotX=90,
9   fillcolor=yellow!50,
10  intersectiontype=0,
11  intersectionplan={[1 -1 0 0][1 1 0 0]},
12  intersectioncolor=(bleu) (rouge),
13  intersectionlinewidth=1.5 1.5,
14  action=draw*](0,6,0)
15 \axesIIIID[linecolor=green,axisemph={\color{green}
16   }](2,6,2)(3,8,3)
17 \end{pspicture}

```

On effectue la première coupe, et on dessine la partie du cylindre qui est conservée pour la suite.



```

1 \begin{pspicture}(-4,-2)(4,2)
2 \psframe(-4,-2)(4,2)
3 \psset{lightsrc=viewpoint,SphericalCoord,viewpoint=100
4   -30 20,Decran=50}
5 \psset{solidmemory}
6 \psSolid[object=platype,
7   definition=equation,
8   args={[1 -1 0 0 ]},
9   base=-4 4 -2 2,
10  name=monplan2]
11 \psSolid[object=cylindre,
12   r=2,
13   h=12,
14   RotX=90,
15   ngrid=9 18,action=none,
16   name=cylindre1](0,6,0)
17 % séparation du cylindre 1
18 \psSolid[object=load,
19   load=cylindre1,
20   plansepare=monplan2,action=none,
21   name=divisioncyindre1]
22 \psSolid[object=load,fillcolor=yellow!50,
23   load=divisioncyindre1]
24 % on trace le plan défini au départ
25 \psSolid[object=plan,
26   definition=platype,
27   args=monplan2,
28   showBase,
29   action=draw
30 ]
31 \composeSolid
32 \end{pspicture}

```

1.2 Deuxième biseau

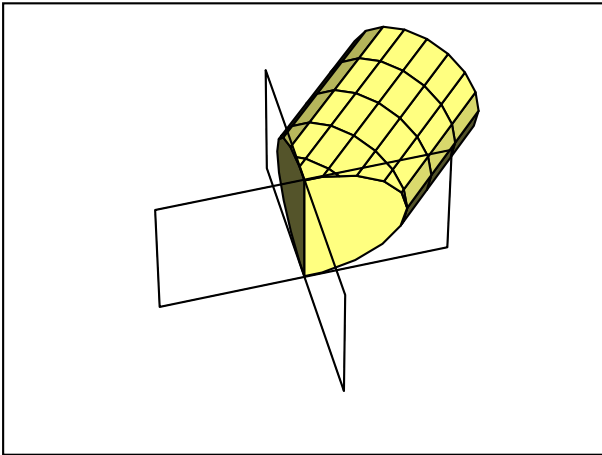
On coupe l'extrémité biseautée par un deuxième biseau à angle droit du premier et on enregistre les données du solide obtenu, afin de ne plus avoir à faire ces calculs :

```

\psSolid[object=load,
  load=cylindre1,
  plansepare=monplan2,action=none,
  name=divisioncyindre1]
\psSolid[object=load,fillcolor=yellow!50,
  load=divisioncyindre1,
  plansepare=monplan1,action=none,
  name=divisioncyindre2]

```

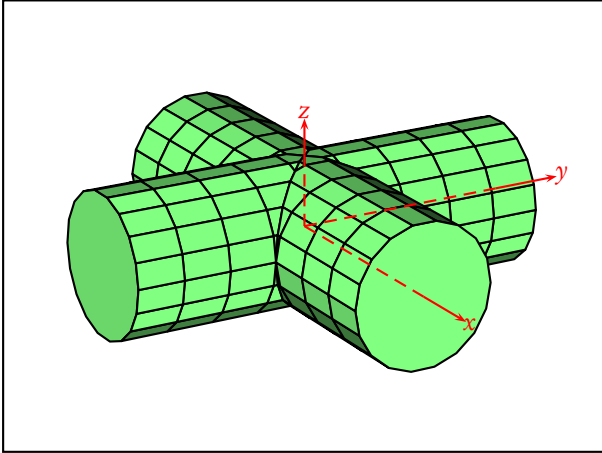
```
\psSolid[object=load,
  load=divisioncylindre20,
  file=cylindrebiseau,
  action=writesolid]
```



```
1 \begin{pspicture}(-4,-3)(4,3)
2 \psframe(-4,-3)(4,3)
3 \psset{lightsrc=viewpoint,SphericalCoord,viewpoint=100
4   -60 50,Decran=50}
5 \psset{solidmemory}
6 \psSolid[object=plantype,
7   definition=equation,
8   args={[1 1 0 0 ]},
9   base=-4 4 -2 2,
10  name=monplan1]
11 \psSolid[object=plantype,
12   definition=equation,
13   args={[1 -1 0 0 ]},
14   base=-4 4 -2 2,
15   name=monplan2]
16 \IfFileExists{cylindrebiseau-sommets.dat}{%
17   \psSolid[object=datfile,fillcolor=yellow!50,
18     file=cylindrebiseau]
19 \psSolid[object=plan,
20   definition=plantype,
21   args=monplan2,
22   action=draw]
23 \psSolid[object=plan,
24   definition=plantype,
25   args=monplan1,
26   action=draw]
27 }{
28 \psSolid[object=cylindre,
29   r=2,
30   h=12,
31   RotX=90,
32   ngrid=9 18,action=none,
33   name=cylindre1](0,6,0)
34 % premier biseau
35 \psSolid[object=load,
36   load=cylindre1,
37   plansepare=monplan2,action=none,
38   name=divisioncylindre1]
39 % second biseau
40 \psSolid[object=load,fillcolor=yellow!50,
41   load=divisioncylindre1,
42   plansepare=monplan1,action=none,
43   name=divisioncylindre2]
44 \psSolid[object=load,
45   load=divisioncylindre20,
46   file=cylindrebiseau,
47   action=writesolid]
48 }
49 \composeSolid
50 \end{pspicture}
```

1.3 Réalisation de la réunion de quatre cylindres

Ce cylindre biseauté va être recopié 3 fois en subissant à chaque fois une rotation de 90° autour de l'axe Oz. La dernière opération consistera à fusionner l'ensemble des quatre cylindres et pour terminer à enregistrer les données de la croix pour, éventuellement, une utilisation ultérieure.

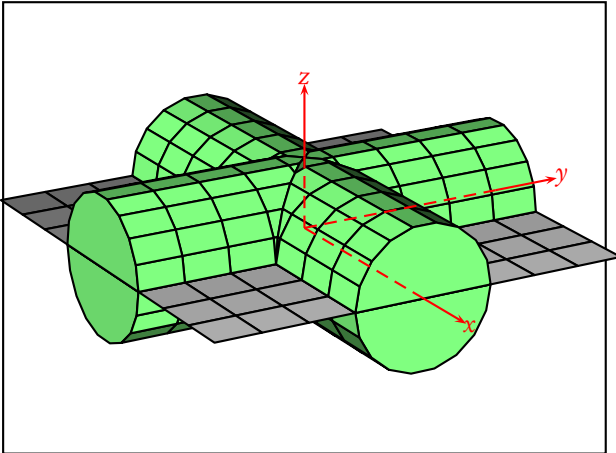


```

1 \begin{pspicture}(-4,-3)(4,3)
2 \psframe(-4,-3)(4,3)
3 \psset{lightsrc=viewpoint,SphericalCoord,viewpoint=100
4   -30 20,Decran=50}
5 \psset{solidmemory}
6 \IfFileExists{cross-sommets.dat}{%
7   \psSolid[object=datfile,
8     file=cross,deactivatecolor]
9 }{
10 \psSolid[object=datfile,
11   file=cylindrebiseau,
12   fillcolor=green!50,
13   action=none,name=cylindrebiseau1]
14 \psSolid[object=datfile,RotZ=90,
15   fillcolor=green!50,
16   file=cylindrebiseau,name=cylindrebiseau2,action
17   =none]
18 \psSolid[object=datfile,RotZ=180,
19   fillcolor=green!50,
20   file=cylindrebiseau,name=cylindrebiseau3,action
21   =none]
22 \psSolid[object=datfile,RotZ=270,
23   fillcolor=green!50,
24   file=cylindrebiseau,name=cylindrebiseau4,action
25   =none]
26 \psSolid[object=fusion,
27   base=cylindrebiseau1 cylindrebiseau2
28   cylindrebiseau3 cylindrebiseau4,
29   action=writesolid,file=cross]%
30 }
31 \axesIIIID[linecolor=red,axisemph={\color{red}}](6,6,2)
32 (8,8,3)
33 %\composeSolid
34 \end{pspicture}

```

1.4 Partager la croix par le plan de symétrie horizontal



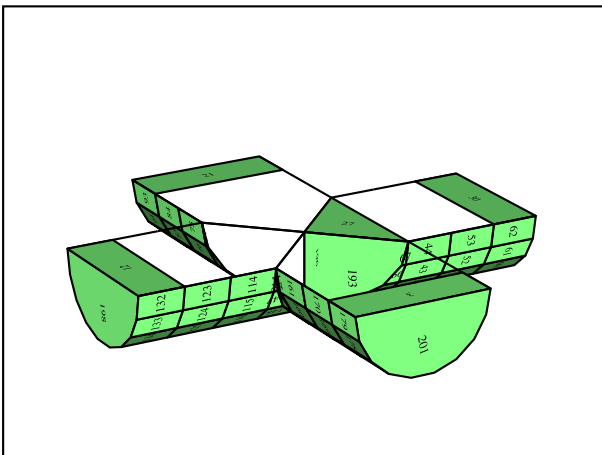
```

1 \begin{pspicture}(-4,-3)(4,3)
2 \psframe(-4,-3)(4,3)
3 \psset{lightsrc=viewpoint,SphericalCoord,viewpoint=100
4   -30 20,Decran=50}
5 \psset{solidmemory}
6 \IfFileExists{cross-sommets.dat}{%
7   \psSolid[object=datfile,
8     file=cross,deactivatecolor,
9     plansepare={[0 0 1 0]},
10    action=none,
11    name=crossdivision]%
12 \psSolid[object=load,deactivatecolor,
13   load=crossdivision1]%
14 \psSolid[object=grille,base=-6 6 -6 6,ngrid=9 9,color1=
15   black!5,color2=black!40, hue=(color2) (color1)]
16 \psSolid[object=load,deactivatecolor,
17   load=crossdivision0]
18 }{
19 \psSolid[object=datfile,
20   file=cylindrebiseau,
21   fillcolor=green!50,
22   action=none,name=cylindrebiseau1]
23 \psSolid[object=datfile,RotZ=90,
24   fillcolor=green!50,
25   file=cylindrebiseau,name=cylindrebiseau2,action
26   =none]
27 \psSolid[object=datfile,RotZ=180,
28   fillcolor=green!50,
29   file=cylindrebiseau,name=cylindrebiseau3,action
30   =none]
31 \psSolid[object=datfile,RotZ=270,
32   fillcolor=green!50,
33   file=cylindrebiseau,name=cylindrebiseau4,action
34   =none]
35 \psSolid[object=fusion,
36   base=cylindrebiseau1 cylindrebiseau2
37   cylindrebiseau3 cylindrebiseau4,
38   action=writesolid,file=cross]%
39 }
40 \axesIIID[linecolor=red,axisemph={\color{red}}](6,6,2)
41 (8,8,4)
42 \end{pspicture}

```

1.5 La structure d'une des deux moitiés

Comme on peut le constater, elle présente une certaine incohérence, du fait de l'absence de nombreuses faces !



```

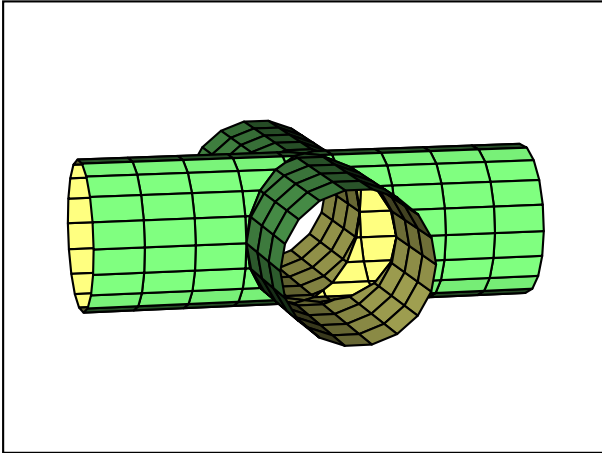
1 \begin{pspicture}(-4,-3)(4,3)
2 \psframe(-4,-3)(4,3)
3 \psset{lightsrc=viewpoint,SphericalCoord,viewpoint=100
4   -30 20,Decran=50}
5 \psset{solidmemory}
6 \psSolid[object=datfile,
7   file=cross,deactivatecolor,
8   plansepare={[0 0 1 0]},
9   action=none,
10  name=crossdivision]%
11 \psSolid[object=load,deactivatecolor,
12   load=crossdivision1,numfaces=all]%(0,0,-2)
13 \composeSolid
14 \end{pspicture}

```

2 Une croix creuse

2.1 On évide le cylindre biseauté

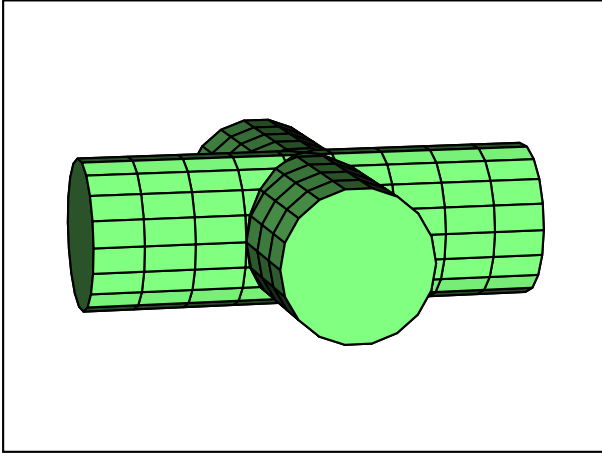
Nous supposons que les données du cylindre biseauté ont été enregistrées. Nous retirons les faces `rm=0 1 68` qui correspondent au biseau et à la face circulaire opposée, les indices des faces ont été obtenus dans une étape intermédiaire avec l'option `numfaces=all`. On répète les mêmes opérations que pour la croix pleine et on enregistre les données du solide creux obtenu.



```
1 \begin{pspicture}(-4,-3)(4,3)
2 \psframe(-4,-3)(4,3)
3 \psset{lightsrc=viewpoint,SphericalCoord,viewpoint=100
4 -13 10,Decran=50}
5 \psset{solidmemory}
6 \IfFileExists{crosshollow-sommets.dat}{%
7 \psSolid[object=datfile,deactivatecolor,
8 file=crosshollow]%
9 }{
10 \psSolid[object=datfile,
11 file=cylindrebiseau,rm=0 1 68,hollow,
12 incolor=yellow!50,fillcolor=green!50,
13 action=none,name=cylindrebiseau1]
14 \psSolid[object=datfile,RotZ=90,rm=0 1 68,hollow,
15 incolor=yellow!50,fillcolor=green!50,
16 file=cylindrebiseau,name=cylindrebiseau2,action
17 =none]
18 \psSolid[object=datfile,RotZ=180,rm=0 1 68,hollow,
19 incolor=yellow!50,fillcolor=green!50,
20 file=cylindrebiseau,name=cylindrebiseau3,action
21 =none]
22 \psSolid[object=datfile,RotZ=270,rm=0 1 68,hollow,
23 incolor=yellow!50,fillcolor=green!50,
24 file=cylindrebiseau,name=cylindrebiseau4,action
25 =none]
26 \psSolid[object=fusion,
27 base=cylindrebiseau1 cylindrebiseau2
28 cylindrebiseau3 cylindrebiseau4,
29 action=writesolid,file=crosshollow]
30 }
31 \composeSolid
32 \end{pspicture}
```

2.2 On évide partiellement le cylindre biseauté

On évide partiellement le cylindre biseauté en gardant la face circulaire et on enregistre les données.



```

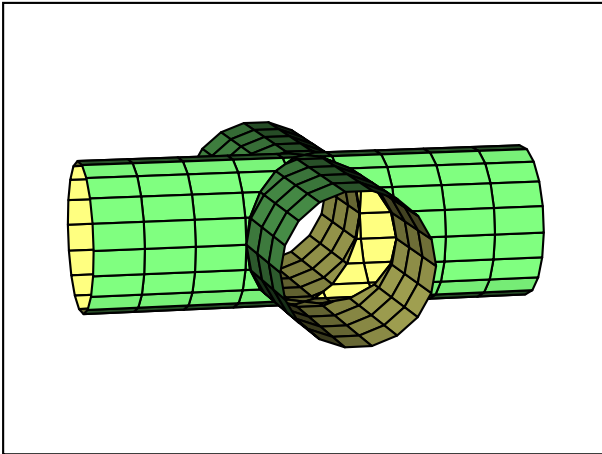
1 \begin{pspicture}(-4,-3)(4,3)
2 \psframe(-4,-3)(4,3)
3 \psset{lightsrc=viewpoint,SphericalCoord,viewpoint=100
4   -13 10,Decran=50}
5 \psset{solidmemory}
6 \IfFileExists{crosshollow2-sommets.dat}{%
7   \psSolid[object=datfile,deactivatecolor,
8     file=crosshollow2]%
9 }{
10 \psSolid[object=datfile,
11   file=cylindrebiseau,rm=0 68,hollow,
12   incolor=yellow!50,fillcolor=green!50,
13   action=none,name=cylindrebiseau1]
14 \psSolid[object=datfile,RotZ=90,rm=0 68,hollow,
15   incolor=yellow!50,fillcolor=green!50,
16   file=cylindrebiseau,name=cylindrebiseau2,action
17   =none]
18 \psSolid[object=datfile,RotZ=180,rm=0 68,hollow,
19   incolor=yellow!50,fillcolor=green!50,
20   file=cylindrebiseau,name=cylindrebiseau3,action
21   =none]
22 \psSolid[object=fusion,
23   base=cylindrebiseau1 cylindrebiseau2
24   cylindrebiseau3 cylindrebiseau4,
25   action=writesolid,file=crosshollow2]
26 \psSolid[object=datfile,deactivatecolor,
27   file=crosshollow2]
28 }
29 \composeSolid
30 \end{pspicture}

```

Nous avons maintenant un solide plein, mais qu'on peut pas partager ! Il faut donc envisager de prendre pour base le cylindre biseauté plein, de supprimer les faces `rm=0 1 68`, mais de ne pas creuser le solide : `hollow`.

2.3 Les deux moitiés de la croix creuse

La croix creuse :

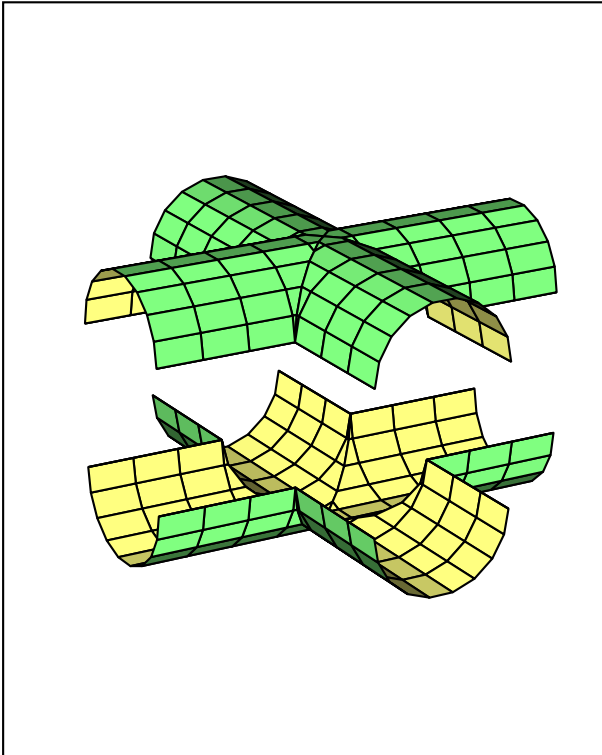


```

1 \begin{pspicture}(-4,-3)(4,3)
2 \psframe(-4,-3)(4,3)
3 \psset{lightsrc=viewpoint,SphericalCoord,viewpoint=100
4   -13 10,Decran=50}
5 \psset{solidmemory}
6 \IfFileExists{cross3-sommets.dat}{%
7   \psSolid[object=datfile,hollow,incolor=yellow!50,
8     fillcolor=green!50,
9     file=cross3]%
10 }{
11 \psSolid[object=datfile,
12   file=cylindrebiseau,rm=0 1 68,
13   fillcolor=green!50,
14   action=none,name=cylindrebiseau1]
15 \psSolid[object=datfile,RotZ=90,rm=0 1 68,
16   fillcolor=green!50,
17   file=cylindrebiseau,name=cylindrebiseau2,action
18   =none]
19 \psSolid[object=datfile,RotZ=180,rm=0 1 68,
20   fillcolor=green!50,
21   file=cylindrebiseau,name=cylindrebiseau3,action
22   =none]
23 \psSolid[object=fusion,
24   base=cylindrebiseau1 cylindrebiseau2
25   cylindrebiseau3 cylindrebiseau4,
26   action=writesolid,file=cross3]
27 \psSolid[object=datfile,deactivatecolor,
28   file=cross3]
29 }
30 \composeSolid
31 \end{pspicture}

```

Les deux moitiés obtenues sont enregistrées.

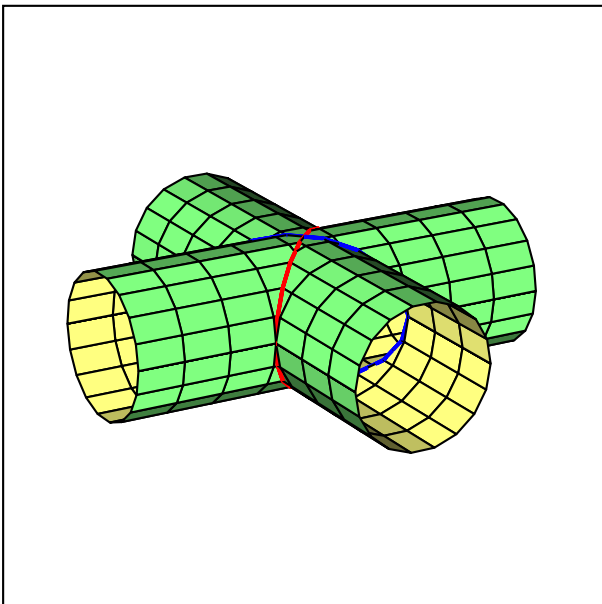


```

1 \begin{pspicture}(-4,-6)(4,6)
2 \psframe(-4,-5)(4,5)
3 \psset{lightsrc=viewpoint,SphericalCoord,viewpoint=100
4 -30 20,Decran=50}
5 \psset{solidmemory}
6 \IfFileExists{cross3division0-sommets.dat}{%
7 \psSolid[object=datfile,deactivatecolor,
8 file=cross3division1](0,0,-2)
9 \psSolid[object=datfile,deactivatecolor,
10 file=cross3division0](0,0,2)
11 }{
12 \psSolid[object=datfile,
13 file=cross3,
14 plansepare={[0 0 1 0]},
15 action=none,
16 name=cross3division}%
17 \psSolid[object=load,hollow,incolor=yellow!50,fillcolor
18 =green!50,
19 load=cross3division1,
20 file=cross3division1,
21 action=writesolid]
22 \psSolid[object=datfile,deactivatecolor,
23 file=cross3division1](0,0,-2)
24 \psSolid[object=load,hollow,incolor=yellow!50,fillcolor
25 =green!50,
26 load=cross3division0,
27 file=cross3division0,
28 action=writesolid]
29 \psSolid[object=datfile,deactivatecolor,
30 file=cross3division0](0,0,2)
31 }
32 \composeSolid
33 \end{pspicture}

```

2.4 Dessiner les lignes d'intersection

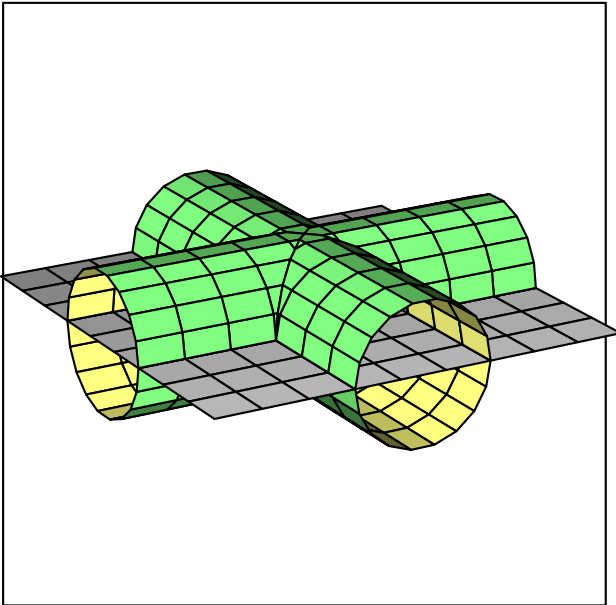


```

1 \begin{pspicture}(-4,-4)(4,4)
2 \psframe(-4,-4)(4,4)
3 \psset{lightsrc=viewpoint,SphericalCoord,viewpoint=100
4 -30 20,Decran=50}
5 \psSolid[object=datfile,deactivatecolor,
6 file=cross3division1,
7 intersectiontype=0,
8 intersectionplan={[1 -1 0 0][1 1 0 0]},
9 intersectioncolor=(bleu) (rouge),
10 intersectionlinewidth=1.5 1.5]
11 \psSolid[object=datfile,deactivatecolor,
12 file=cross3division0,
13 intersectiontype=0,
14 intersectionplan={[1 -1 0 0][1 1 0 0]},
15 intersectioncolor=(bleu) (rouge),
16 intersectionlinewidth=1.5 1.5]
17 \end{pspicture}

```

2.5 Intercaler en sandwich, un quadrillage entre les deux moitiés

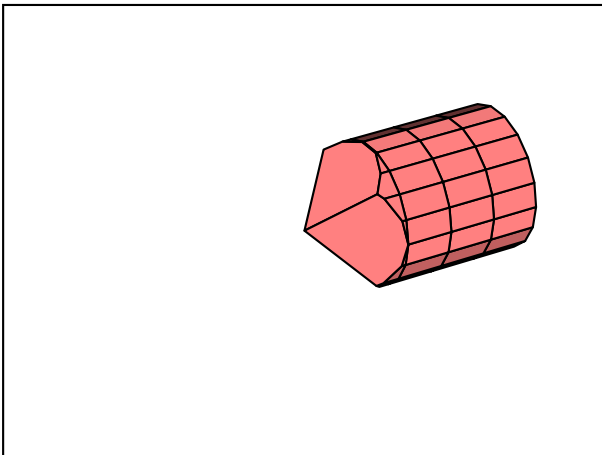


```

1 \begin{pspicture}(-4,-4)(4,4)
2 \psframe(-4,-4)(4,4)
3 \psset{lightsrc=viewpoint,SphericalCoord,viewpoint=100
4 -30 20,Decran=50}
5 \psSolid[object=datfile,deactivatecolor,
6 file=cross3division1]
7 \psSolid[object=grille,base=-6 6 -6 6,ngrid=9 9,color1=
8 white,color2=gray!50, hue=(color2) (color1)]
9 \psSolid[object=datfile,deactivatecolor,
10 file=cross3division0]
11 \end{pspicture}

```

3 Tailler l'extrémité du cylindre en pointe avec 4 facettes



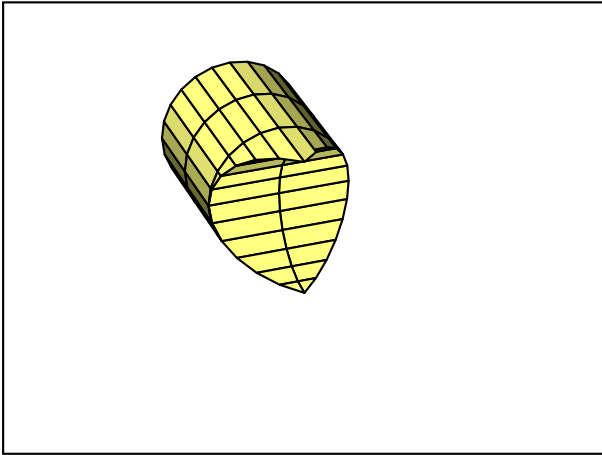
```

1 \begin{pspicture}(-4,-3)(4,3)
2 \psframe(-4,-3)(4,3)
3 \psset{lightsrc=viewpoint,SphericalCoord,viewpoint=100
4 -30 30,Decran=50}
5 \IfFileExists{cylindrepointe-sommets.dat}{%
6 \psSolid[object=datfile,
7 fillcolor=red!50,
8 file=cylindrepointe]
9 }{
10 \psset{solidmemory}
11 \psSolid[object=datfile,
12 file=cylindrebiseau,
13 plansepare={[0 -1 1 0]},
14 fillcolor=green!50,
15 action=none,name=cylindrepointe1]
16 \psSolid[object=load,
17 load=cylindrepointe11,
18 plansepare={[0 1 1 0]},
19 action=none,name=cylindrepointe2]
20 \psSolid[object=load,fillcolor=red!50,
21 load=cylindrepointe20,action=none,
22 file=cylindrepointe,action=writesolid]
23 \composeSolid
24 }
25 \end{pspicture}

```

4 Intersection de trois cylindres identiques d'axes orthogonaux

4.1 Le cylindre et sa face concave

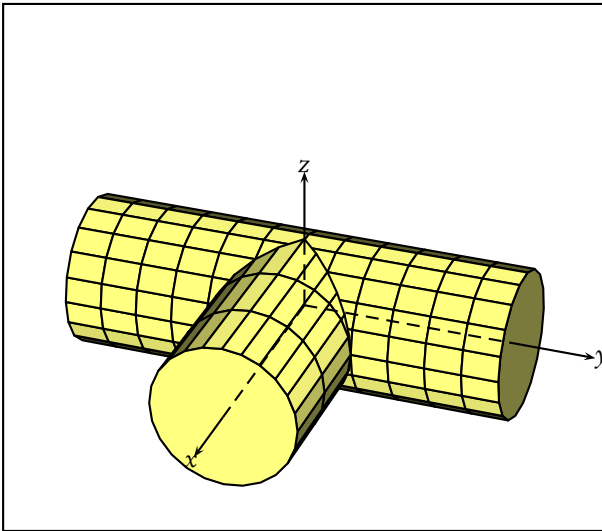


```

1 \begin{pspicture}(-4,-3)(4,3)
2 \psframe(-4,-3)(4,3)
3 \IfFileExists{cylindreconcave-sommets.dat}{%
4 \psset{lightsrc=viewpoint,SphericalCoor,viewpoint=100
5 160 30,Decran=50}
6 \psSolid[object=datfile,fillcolor=yellow!50,
7 file=cylindreconcave]
8 }{%
9 \codejps{
10 % pour enregistrer les données
11 % du cylindre sans le biseau
12 % avec la partie enlevée en creux
13 -6 2 6 [6 24] newcylindre
14 {0 90 0 rotateOpoint3d} solidtransform
15 [1 -1 0 0] solidplansepare
16 /cylindretest1 exch def
17 /cylindretest0 exch def
18 cylindretest0
19 [1 1 0 0] solidplansepare
20 /cylindretest21 exch def
21 /cylindretest20 exch def
22 cylindretest21
23 dup [0 13] solidrmfaces
24 dup solidfacesreverse
25 /faceconcave exch def
26 faceconcave
27 {0 0 90 rotateOpoint3d} solidtransform
28 /faceconcave exch def
29 cylindretest20
30 dup [0 62] solidrmfaces
31 faceconcave
32 solidfuz
33 (cylindreconcave) writesolidfile
34 }
35 \end{pspicture}

```

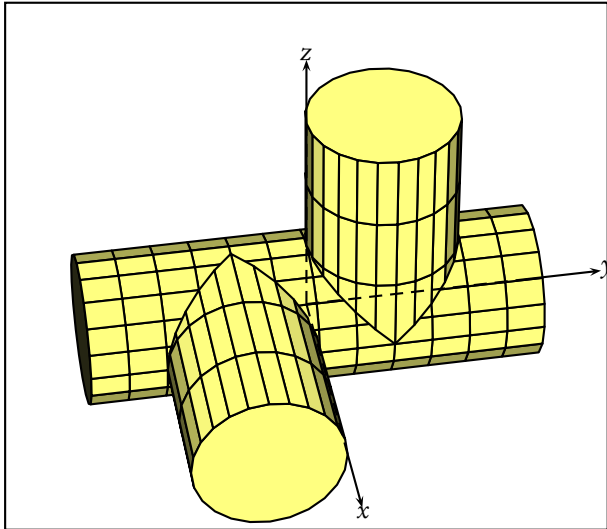
4.2 Raccordement d'un, deux ou trois cylindres sur le cylindre principal



```

1 \begin{pspicture}(-4,-3)(4,4)
2 \psframe(-4,-3)(4,4)
3 \psset{lightsrc=viewpoint,SphericalCoor,viewpoint=100
4 20 30,Decran=50}
5 \psset{solidmemory}
6 \psSolid[object=cylindre,
7 r=2,
8 h=12,
9 RotX=90,
10 fillcolor=yellow!50,
11 ngrid=12 18,action=none,
12 name=cylindre1](0,6,0)
13 \psSolid[object=datfile,fillcolor=yellow!50,
14 file=cylindreconcave,
15 action=none,
16 name=cylindrebranche1
17 ]
18 \psSolid[object=fusion,deactivatecolor,
19 base=cylindre1 cylindrebranche1]%
20 \axesIIID(6,6,2)(8,8,4)
21 \composeSolid
22 \end{pspicture}

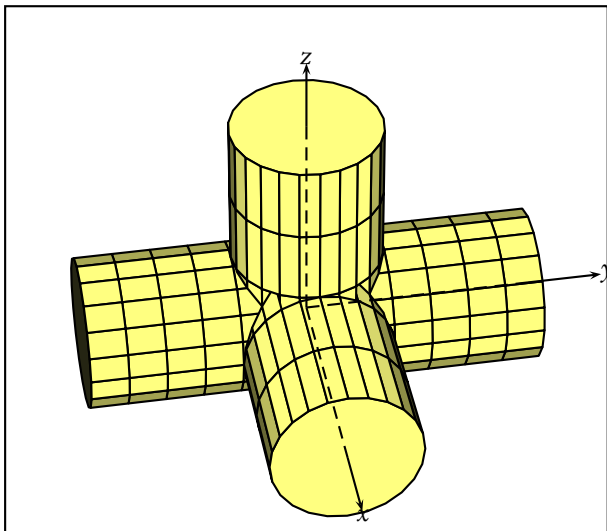
```



```

1 \begin{pspicture}(-4,-3)(4,4)
2 \psframe(-4,-3)(4,4)
3 \psset{lightsrc=viewpoint,SphericalCoord,viewpoint=100
4 -10 40,Decran=50}
5 \psset{solidmemory}
6 \psSolid[object=cylindre,
7 r=2,
8 h=12,
9 RotX=90,
10 fillcolor=yellow!50,
11 ngrid=12 18,action=none,
12 name=cylindre1](0,6,0)
13 \psSolid[object=datfile,fillcolor=yellow!50,
14 file=cylindreconcave,
15 action=none,
16 name=cylindrebranche1
17 ](0,-2,0)
18 \psSolid[object=datfile,fillcolor=yellow!50,
19 file=cylindreconcave,
20 action=none,RotY=-90,
21 name=cylindrebranche2
22 ](0,2,0)
23 \psSolid[object=fusion,deactivatecolor,
24 base=cylindre1 cylindrebranche2 cylindrebranche
25 1]%
26 \axesIIID(6,6,6)(8,8,8)
27 \composeSolid
28 \end{pspicture}

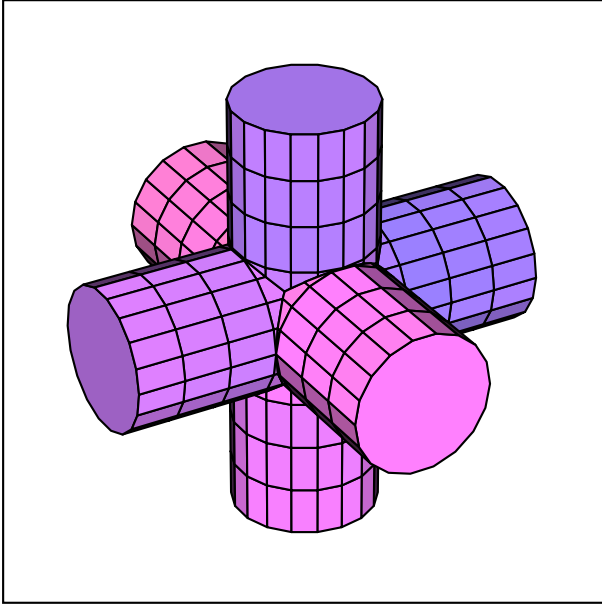
```



```

1 \begin{pspicture}(-4,-3)(4,4)
2 \psframe(-4,-3)(4,4)
3 \psset{lightsrc=viewpoint,SphericalCoord,viewpoint=100
4 -10 40,Decran=50}
5 \psset{solidmemory}
6 \psSolid[object=cylindre,
7 r=2,
8 h=12,
9 RotX=90,
10 fillcolor=yellow!50,
11 ngrid=12 18,action=none,
12 name=cylindre1](0,6,0)
13 \psSolid[object=datfile,fillcolor=yellow!50,
14 file=cylindreconcave,
15 action=none,
16 name=cylindrebranche1
17 ](0,0,0)
18 \psSolid[object=datfile,fillcolor=yellow!50,
19 file=cylindreconcave,
20 action=none,RotY=-90,
21 name=cylindrebranche2
22 ](0,0,0)
23 \psSolid[object=fusion,deactivatecolor,
24 base=cylindre1 cylindrebranche2 cylindrebranche
25 1]%
26 \axesIIID(6,6,6)(8,8,8)
27 \composeSolid
28 \end{pspicture}

```

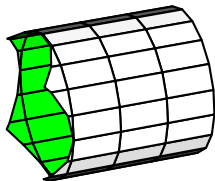


```

1 \begin{pspicture}(-4,-4)(4,4)
2 \psframe(-4,-4)(4,4)
3 \IfFileExists{3cylindrespleins-sommets.dat}{%
4 \psset{lightsrc=viewpoint,SphericalCoor,viewpoint=100
5 -30 30,Decran=50}
6 \psSolid[object=datfile,hue=0.7 0.9 0.5 1,
7 file=3cylindrespleins]
8 }{
9 \psset{solidmemory}
10 \psSolid[object=datfile,
11 file=cylindrepointe,
12 action=none,
13 name=cylindre1]
14 \psSolid[object=datfile,
15 RotX=90,
16 file=cylindrepointe,
17 action=none,
18 name=cylindre2]
19 \psSolid[object=datfile,
20 RotX=180,
21 file=cylindrepointe,
22 action=none,
23 name=cylindre3]
24 \psSolid[object=datfile,
25 RotX=270,
26 file=cylindrepointe,
27 action=none,
28 name=cylindre4]
29 \psSolid[object=datfile,
30 RotZ=-90,
31 file=cylindrepointe,
32 action=none,
33 name=cylindre5]
34 \psSolid[object=datfile,
35 RotZ=90,
36 file=cylindrepointe,
37 action=none,
38 name=cylindre6]
39 \psSolid[object=fusion,
40 base=cylindre1 cylindre2
41 cylindre3 cylindre4
42 cylindre5 cylindre6,
43 file=3cylindrespleins,action=writesolid]
44 \composeSolid
45 }
46 \end{pspicture}

```

4.3 Suppression des faces de la pointe et de la face circulaire

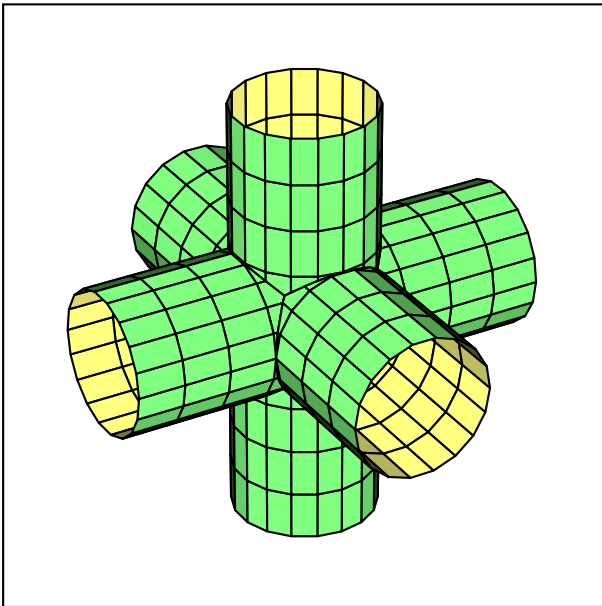


```

1 \begin{pspicture}(-4,-3)(4,4)
2 %\psframe(-4,-3)(4,4)
3 \psset{solidmemory}
4 \psset{lightsrc=viewpoint,SphericalCoor,viewpoint=100
5 -20 30,Decran=50}
6 \psSolid[object=datfile,
7 file=cylindrepointe,
8 % numfaces=all
9 rm=0 1 2 75 76,
10 name=cylindrepointeevide1,
11 action=none]
12 \psSolid[object=load,
13 load=cylindrepointeevide1,
14 file=cylindrepointeevide,
15 action=writesolid]
16 \psSolid[object=datfile,
17 file=cylindrepointeevide,
18 hollow
19 ]
20 \composeSolid
21 \end{pspicture}

```

4.4 Intersection des 3 cylindres d'axes orthogonaux

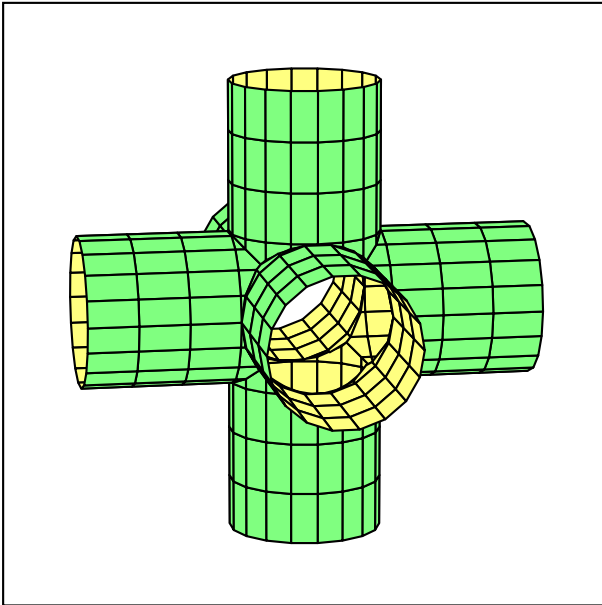


```

1 \begin{pspicture}(-4,-4)(4,4)
2 \psframe(-4,-4)(4,4)
3 \psset{lightsrc=viewpoint,SphericalCoord,viewpoint=100
4   -30 30,Decran=50}
5 \IfFileExists{3cylindrescreux-sommets.dat}{%
6   \psSolid[object=datfile,deactivatecolor,
7     file=3cylindrescreux]
8 }{
9 \psset{solidmemory}
10 \psSolid[object=datfile,
11   file=cylindrepointeevide,
12   incolor=yellow!50,
13   fillcolor=green!50,
14   hollow,
15   action=none,
16   name=cylindre1]
17 \psSolid[object=datfile,
18   RotX=90,
19   file=cylindrepointeevide,
20   incolor=yellow!50,
21   fillcolor=green!50,
22   hollow,
23   action=none,
24   name=cylindre2]
25 \psSolid[object=datfile,
26   RotX=180,
27   file=cylindrepointeevide,
28   incolor=yellow!50,
29   fillcolor=green!50,
30   hollow,
31   action=none,
32   name=cylindre3]
33 \psSolid[object=datfile,
34   RotX=270,
35   file=cylindrepointeevide,
36   incolor=yellow!50,
37   fillcolor=green!50,
38   hollow,
39   action=none,
40   name=cylindre4]
41 \psSolid[object=datfile,
42   RotZ=-90,
43   file=cylindrepointeevide,
44   incolor=yellow!50,
45   fillcolor=green!50,
46   hollow,
47   action=none,
48   name=cylindre5]
49 \psSolid[object=datfile,
50   RotZ=90,
51   file=cylindrepointeevide,
52   incolor=yellow!50,
53   fillcolor=green!50,
54   hollow,
55   action=none,
56   name=cylindre6]
57 \psSolid[object=fusion,%deactivatecolor,
58   base=cylindre1 cylindre2
59   cylindre3 cylindre4
60   cylindre5 cylindre6,
61   file=3cylindrescreux,action=writesolid]
62 \composeSolid
63 }
64 \end{pspicture}

```

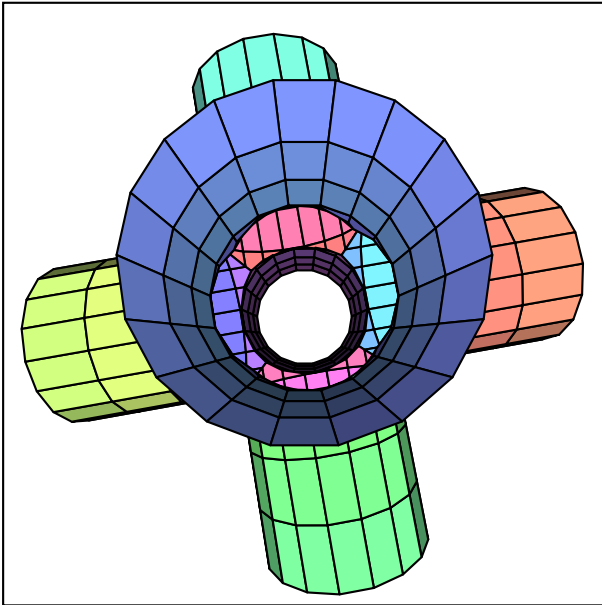
4.5 Une vue rapprochée



```

1 \begin{pspicture}(-4,-4)(4,4)
2 \psframe(-4,-4)(4,4)
3 \psset{SphericalCoor,viewpoint=100 -10 12,Decran=50}
4 \psSolid[object=datfile,deactivatecolor,
5         file=3cylindrescreux]
6 \end{pspicture}

```

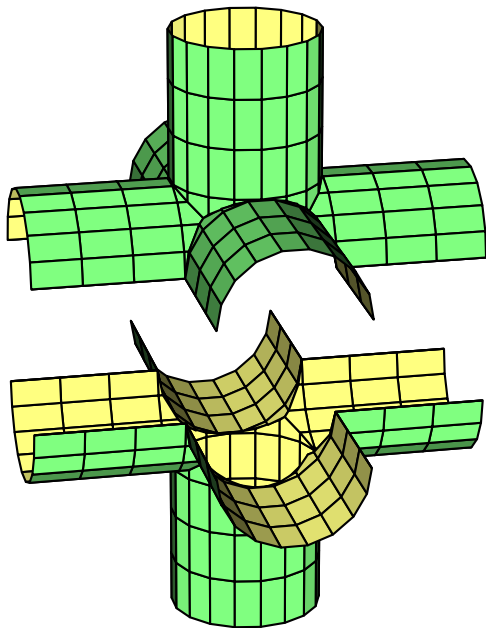


```

1 \begin{pspicture*}(-4,-4)(4,4)
2 \psframe(-4,-4)(4,4)
3 \psset{lightsrc=viewpoint,SphericalCoor,viewpoint=10
4       -10 85,Decran=5}
5 \psSolid[object=datfile,inouthue=0 1 0.5 1,
6         file=3cylindrescreux]
7 \end{pspicture*}

```

4.6 Séparation par le plan de symétrie horizontal



```

1 \begin{pspicture}(-4,-6)(4,6)
2 \psframe(-4,-6)(4,6)
3 \psset{lightsrc=viewpoint,SphericalCoor,viewpoint=100
4   -12 20,Decran=50}
5 \psset{solidmemory}
6 \psSolid[object=datfile,
7   file=3cylindresevides,
8   plansepare={[0 0 1 0]},
9   action=none,
10  name=3cylindresevidesdivision]
11 \psSolid[object=load,hollow,
12   incol=yellow!50,
13   fillcolor=green!50,
14   load=3cylindresevidesdivision1](0,0,-2)
15 \psSolid[object=load,hollow,
16   incol=yellow!50,
17   fillcolor=green!50,
18   load=3cylindresevidesdivision0](0,0,2)
19 \composeSolid
20 \end{pspicture}

```