pst-solides3d : variations autour d'un cylindre

10 juillet 2008

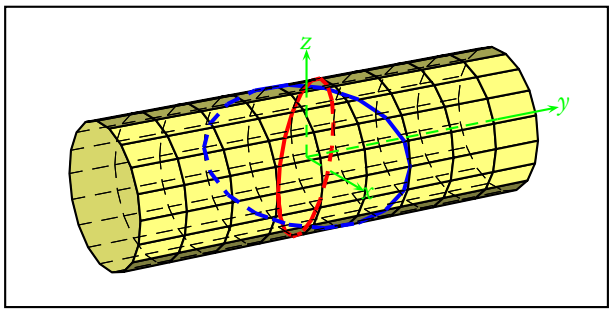
Table des matières

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.

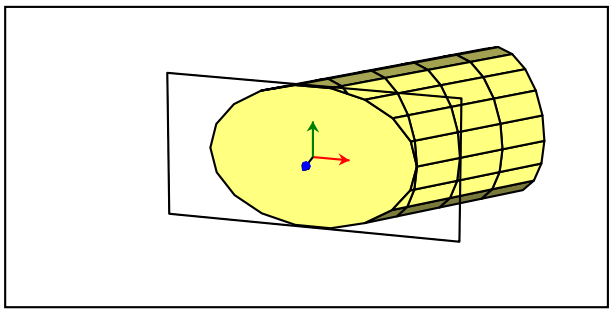
1.1 Taillage d'une extrémité du cylindre en biseau

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




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

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



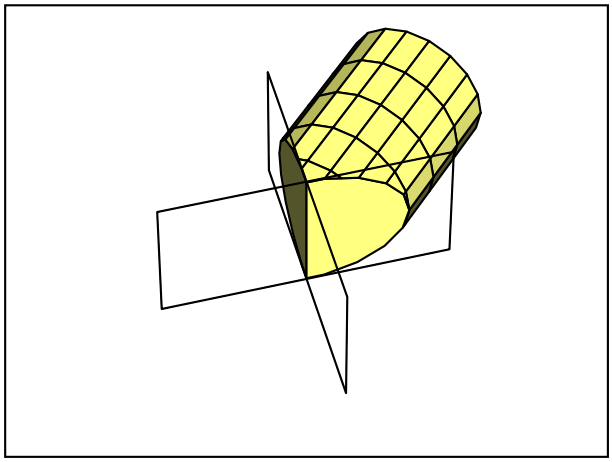
```
\begin{pspicture}(-4,-2)(4,2)
\psframe(-4,-2)(4,2)
\psset{lightsrc=viewpoint,SphericalCoor,viewpoint=100
  -30 20,Decran=50}
\psset{solidmemory}
\psSolid[object=plantype,
   definition=equation,
   args={[1 -1 0 0 ]},
   base=-4 4 -2 2,
   name=monplan2]
\psSolid[object=cylindre,
   r=2,
   h=12,
   RotX=90,
   ngrid=9 18,action=none,
   name=cylindre1](0,6,0)
% séparation du cylindre 1
\psSolid[object=load,
        load=cylindre1,
        plansepare=monplan2,action=none,
        name=divisioncylindre1]
\psSolid[object=load,fillcolor=yellow!50,
        load=divisioncylindre11]
% on trace le plan défini au départ
\psSolid[object=plan,
   definition=plantype,
   args=monplan2,
   showBase,
   action=draw
]
\composeSolid
\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=divisioncylindre1]
\psSolid[object=load,fillcolor=yellow!50,
        load=divisioncylindre11,
        plansepare=monplan1,action=none,
        name=divisioncylindre2]
```

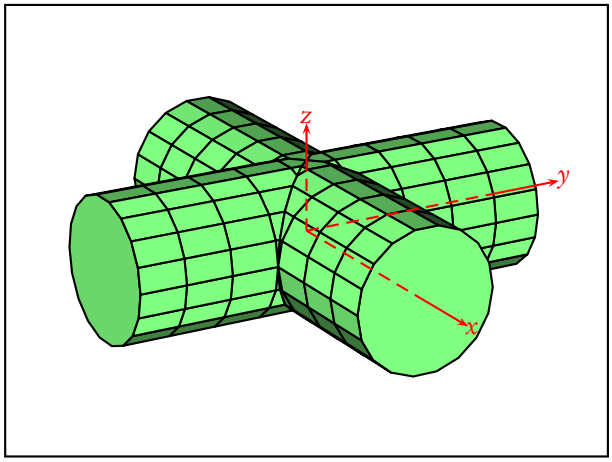
```
\psSolid[object=load,
       load=divisioncylindre20,
       file=cylindrebiseau,
       action=writesolid]
```



```
\begin{pspicture}(-4,-3)(4,3)
\psframe(-4,-3)(4,3)
\psset{lightsrc=viewpoint,SphericalCoor,viewpoint=100
  -60 50,Decran=50}
\psset{solidmemory}
\psSolid[object=plantype,
   definition=equation,
   args={[1 1 0 0 ]},
   base=-4 4 -2 2,
   name=monplan1]
\psSolid[object=plantype,
   definition=equation,
   args={[1 -1 0 0 ]},
   base=-4 4 -2 2,
   name=monplan2]
\IfFileExists{cylindrebiseau-sommets.dat}{%
\psSolid[object=datfile,fillcolor=yellow!50,
       file=cylindrebiseau]
\psSolid[object=plan,
   definition=plantype,
   args=monplan2,
   action=draw]
\psSolid[object=plan,
   definition=plantype,
   args=monplan1,
   action=draw]
}{
\psSolid[object=cylindre,
   r=2,
   h=12,
   RotX=90,
   ngrid=9 18,action=none,
   name=cylindre1](0,6,0)
% premier biseau
\psSolid[object=load,
       load=cylindre1,
       plansepare=monplan2,action=none,
       name=divisioncylindre1]
% second biseau
\psSolid[object=load,fillcolor=yellow!50,
       load=divisioncylindre11,
       plansepare=monplan1,action=none,
       name=divisioncylindre2]
\psSolid[object=load,
      load=divisioncylindre20,
      file=cylindrebiseau,
      action=writesolid]
}
\composeSolid
\end{pspicture}
```

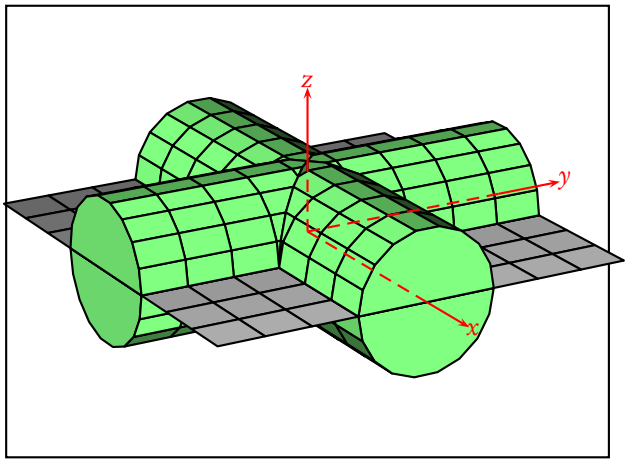
1.3 Réalisation de la réunion de quatre cylindres

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.




```
\begin{pspicture}(-4,-3)(4,3)
\psframe(-4,-3)(4,3)
\psset{lightsrc=viewpoint,SphericalCoor,viewpoint=100
  -30 20,Decran=50}
\psset{solidmemory}
\IfFileExists{cross-sommets.dat}{%
\psSolid[object=datfile,
       file=cross,deactivatecolor]
}{
\psSolid[object=datfile,
       file=cylindrebiseau,
       fillcolor=green!50,
       action=none,name=cylindrebiseau1]
\psSolid[object=datfile,RotZ=90,
       fillcolor=green!50,
       file=cylindrebiseau,name=cylindrebiseau2,action
         =none]
\psSolid[object=datfile,RotZ=180,
       fillcolor=green!50,
       file=cylindrebiseau,name=cylindrebiseau3,action
         =none]
\psSolid[object=datfile,RotZ=270,
       fillcolor=green!50,
       file=cylindrebiseau,name=cylindrebiseau4,action
         =none]
\psSolid[object=fusion,
       base=cylindrebiseau1 cylindrebiseau2
       cylindrebiseau3 cylindrebiseau4,
       action=writesolid,file=cross]%
}
\axesIIID[linecolor=red,axisemph={\color{red}}](6,6,2)
  (8,8,3)
%\composeSolid
\end{pspicture}
```

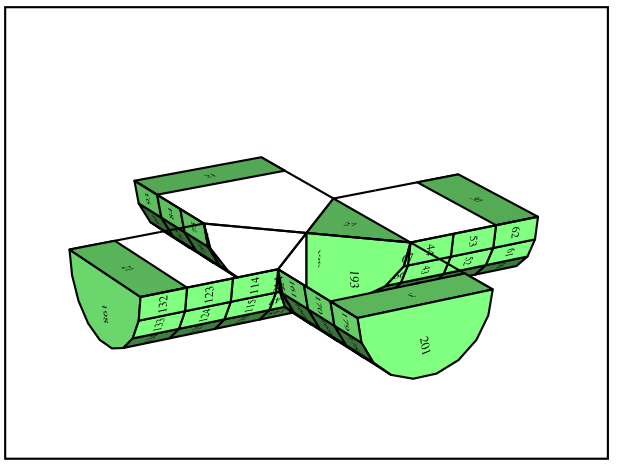
1.4 Partager la croix par le plan de symétrie horizontal




```
\begin{pspicture}(-4,-3)(4,3)
\psframe(-4,-3)(4,3)
\psset{lightsrc=viewpoint,SphericalCoor,viewpoint=100
  -30 20,Decran=50}
\psset{solidmemory}
\IfFileExists{cross-sommets.dat}{%
\psSolid[object=datfile,
        file=cross,deactivatecolor,
        plansepare={[0 0 1 0]},
        action=none,
        name=crossdivision]%
\psSolid[object=load,deactivatecolor,
        load=crossdivision1]%
\psSolid[object=grille,base=-6 6 -6 6,ngrid=9 9,color1=
  black!5,color2=black!40, hue=(color2) (color1)]
\psSolid[object=load,deactivatecolor,
        load=crossdivision0]
}{
\psSolid[object=datfile,
        file=cylindrebiseau,
        fillcolor=green!50,
        action=none,name=cylindrebiseau1]
\psSolid[object=datfile,RotZ=90,
        fillcolor=green!50,
        file=cylindrebiseau,name=cylindrebiseau2,action
          =none]
\psSolid[object=datfile,RotZ=180,
        fillcolor=green!50,
        file=cylindrebiseau,name=cylindrebiseau3,action
          =none]
\psSolid[object=datfile,RotZ=270,
        fillcolor=green!50,
        file=cylindrebiseau,name=cylindrebiseau4,action
          =none]
\psSolid[object=fusion,
        base=cylindrebiseau1 cylindrebiseau2
        cylindrebiseau3 cylindrebiseau4,
        action=writesolid,file=cross]%
}
\axesIIID[linecolor=red,axisemph={\color{red}}](6,6,2)
  (8,8,4)
\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 !

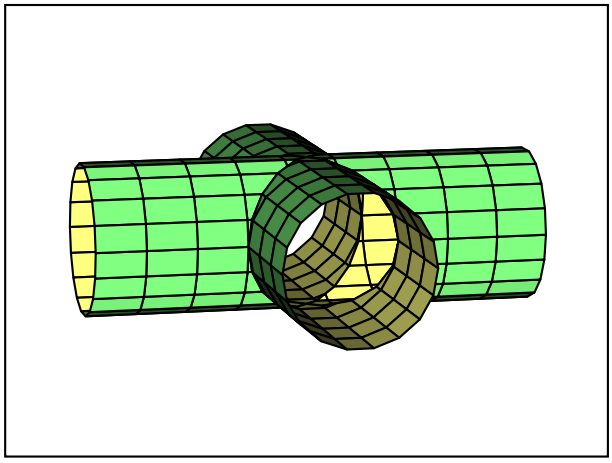


```
\begin{pspicture}(-4,-3)(4,3)
\psframe(-4,-3)(4,3)
\psset{lightsrc=viewpoint,SphericalCoor,viewpoint=100
  -30 20,Decran=50}
\psset{solidmemory}
\psSolid[object=datfile,
        file=cross,deactivatecolor,
        plansepare={[0 0 1 0]},
        action=none,
        name=crossdivision]%
\psSolid[object=load,deactivatecolor,
        load=crossdivision1,numfaces=all]%(0,0,-2)
\composeSolid
\end{pspicture}
```

2 Une croix creuse

2.1 On évide le cylindre biseauté

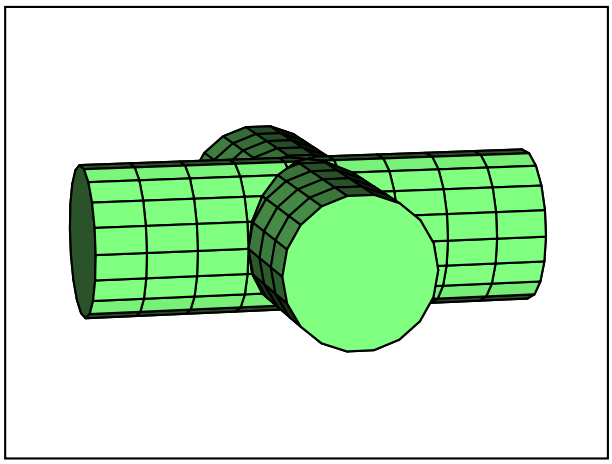
Nous supposons que les données du cylindre biseauté ont été enregistrées. Nous retirons les faces `rm=0 1 68` qui correspondent au biseau et à la face circulaire opposée, les indices des faces ont été obtenus dans une étape intermédiaire avec l'option `numfaces=all`. On répète les mêmes opérations que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



```
\begin{pspicture}(-4,-3)(4,3)
\psframe(-4,-3)(4,3)
\psset{lightsrc=viewpoint,SphericalCoor,viewpoint=100
  -13 10,Decran=50}
\psset{solidmemory}
\IfFileExists{crosshollow-sommets.dat}{%
\psSolid[object=datfile,deactivatecolor,
       file=crosshollow]%
}{
\psSolid[object=datfile,
       file=cylindrebiseau,rm=0 1 68,hollow,
       incolor=yellow!50,fillcolor=green!50,
       action=none,name=cylindrebiseau1]
\psSolid[object=datfile,RotZ=90,rm=0 1 68,hollow,
       incolor=yellow!50,fillcolor=green!50,
       file=cylindrebiseau,name=cylindrebiseau2,action
         =none]
\psSolid[object=datfile,RotZ=180,rm=0 1 68,hollow,
       incolor=yellow!50,fillcolor=green!50,
       file=cylindrebiseau,name=cylindrebiseau3,action
         =none]
\psSolid[object=datfile,RotZ=270,rm=0 1 68,hollow,
       incolor=yellow!50,fillcolor=green!50,
       file=cylindrebiseau,name=cylindrebiseau4,action
         =none]
\psSolid[object=fusion,
       base=cylindrebiseau1 cylindrebiseau2
       cylindrebiseau3 cylindrebiseau4,
       action=writesolid,file=crosshollow]
}
\composeSolid
\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.

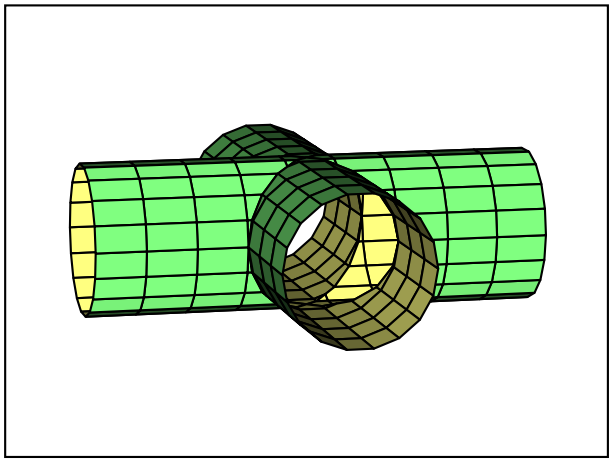


```
\begin{pspicture}(-4,-3)(4,3)
\psframe(-4,-3)(4,3)
\psset{lightsrc=viewpoint,SphericalCoor,viewpoint=100
  -13 10,Decran=50}
\psset{solidmemory}
\IfFileExists{crosshollow2-sommets.dat}{%
\psSolid[object=datfile,deactivatecolor,
       file=crosshollow2]%
}{
\psSolid[object=datfile,
       file=cylindrebiseau,rm=0 68,hollow,
       incolor=yellow!50,fillcolor=green!50,
       action=none,name=cylindrebiseau1]
\psSolid[object=datfile,RotZ=90,rm=0 68,hollow,
       incolor=yellow!50,fillcolor=green!50,
       file=cylindrebiseau,name=cylindrebiseau2,action
         =none]
\psSolid[object=datfile,RotZ=180,rm=0 68,hollow,
       incolor=yellow!50,fillcolor=green!50,
       file=cylindrebiseau,name=cylindrebiseau3,action
         =none]
\psSolid[object=datfile,RotZ=270,rm=0 68,hollow,
       incolor=yellow!50,fillcolor=green!50,
       file=cylindrebiseau,name=cylindrebiseau4,action
         =none]
\psSolid[object=fusion,
       base=cylindrebiseau1 cylindrebiseau2
       cylindrebiseau3 cylindrebiseau4,
       action=writesolid,file=crosshollow2]
\psSolid[object=datfile,deactivatecolor,
       file=crosshollow2]
}
\composeSolid
\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`~~.

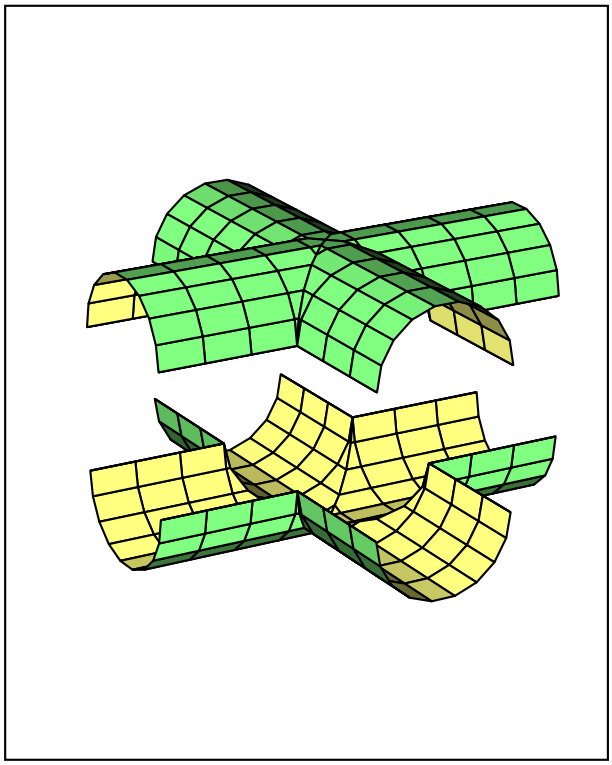
2.3 Les deux moitiés de la croix creuse

La croix creuse :



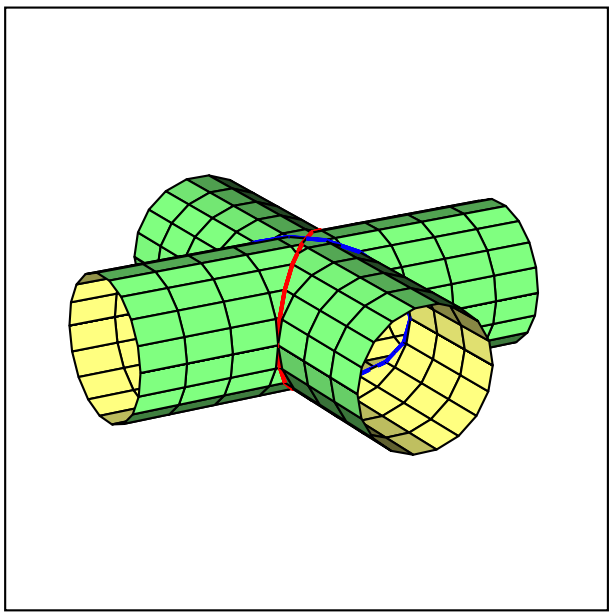
```
\begin{pspicture}(-4,-3)(4,3)
\psframe(-4,-3)(4,3)
\psset{lightsrc=viewpoint,SphericalCoor,viewpoint=100
  -13 10,Decran=50}
\psset{solidmemory}
\IfFileExists{cross3-sommets.dat}{%
\psSolid[object=datfile,hollow,incolor=yellow!50,
  fillcolor=green!50,
       file=cross3]%
}{
\psSolid[object=datfile,
       file=cylindrebiseau,rm=0 1 68,
       fillcolor=green!50,
       action=none,name=cylindrebiseau1]
\psSolid[object=datfile,RotZ=90,rm=0 1 68,
       fillcolor=green!50,
       file=cylindrebiseau,name=cylindrebiseau2,action
         =none]
\psSolid[object=datfile,RotZ=180,rm=0 1 68,
       fillcolor=green!50,
       file=cylindrebiseau,name=cylindrebiseau3,action
         =none]
\psSolid[object=datfile,RotZ=270,rm=0 1 68,
       fillcolor=green!50,
       file=cylindrebiseau,name=cylindrebiseau4,action
         =none]
\psSolid[object=fusion,
       base=cylindrebiseau1 cylindrebiseau2
       cylindrebiseau3 cylindrebiseau4,
       action=writesolid,file=cross3]
\psSolid[object=datfile,deactivatecolor,
       file=cross3]
}
\composeSolid
\end{pspicture}
```

Les deux moitiés obtenues sont enregistrées.



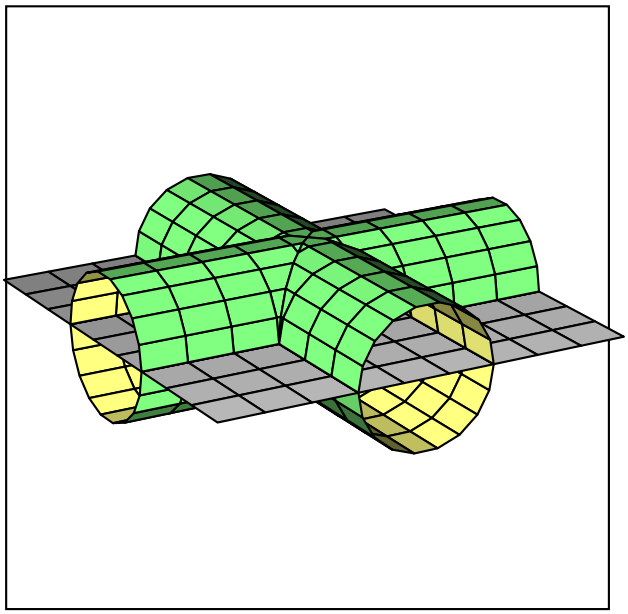
```
\begin{pspicture}(-4,-6)(4,6)
\psframe(-4,-5)(4,5)
\psset{lightsrc=viewpoint,SphericalCoor,viewpoint=100
  -30 20,Decran=50}
\psset{solidmemory}
\IfFileExists{cross3division0-sommets.dat}{%
\psSolid[object=datfile,deactivatecolor,
       file=cross3division1](0,0,-2)
\psSolid[object=datfile,deactivatecolor,
       file=cross3division0](0,0,2)
}{
\psSolid[object=datfile,
       file=cross3,
       plansepare={[0 0 1 0]},
       action=none,
       name=cross3division]%
\psSolid[object=load,hollow,incolor=yellow!50,fillcolor
  =green!50,
       load=cross3division1,
       file=cross3division1,
       action=writesolid]
\psSolid[object=datfile,deactivatecolor,
       file=cross3division1](0,0,-2)
\psSolid[object=load,hollow,incolor=yellow!50,fillcolor
  =green!50,
       load=cross3division0,
       file=cross3division0,
       action=writesolid]
\psSolid[object=datfile,deactivatecolor,
       file=cross3division0](0,0,2)
}
\composeSolid
\end{pspicture}
```

2.4 Dessiner les lignes d'intersection



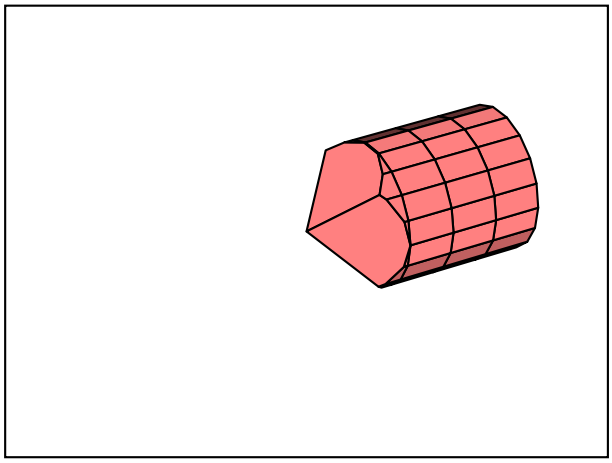
```
\begin{pspicture}(-4,-4)(4,4)
\psframe(-4,-4)(4,4)
\psset{lightsrc=viewpoint,SphericalCoor,viewpoint=100
  -30 20,Decran=50}
\psSolid[object=datfile,deactivatecolor,
       file=cross3division1,
       intersectiontype=0,
       intersectionplan={[1 -1 0 0][1 1 0 0]},
       intersectioncolor=(bleu) (rouge),
       intersectionlinewidth=1.5 1.5]
\psSolid[object=datfile,deactivatecolor,
       file=cross3division0,
       intersectiontype=0,
       intersectionplan={[1 -1 0 0][1 1 0 0]},
       intersectioncolor=(bleu) (rouge),
       intersectionlinewidth=1.5 1.5]
\end{pspicture}
```

2.5 Intercaler en sandwich, un quadrillage entre les deux moitiés



```
\begin{pspicture}(-4,-4)(4,4)
\psframe(-4,-4)(4,4)
\psset{lightsrc=viewpoint,SphericalCoor,viewpoint=100
  -30 20,Decran=50}
\psSolid[object=datfile,deactivatecolor,
       file=cross3division1]
\psSolid[object=grille,base=-6 6 -6 6,ngrid=9 9,color1=
  white,color2=gray!50, hue=(color2) (color1)]
\psSolid[object=datfile,deactivatecolor,
       file=cross3division0]
\end{pspicture}
```

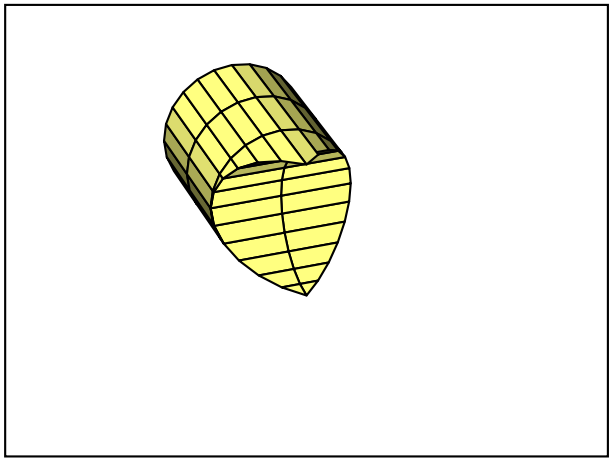
3 Tailler l'extrémité du cylindre en pointe avec 4 facettes



```
\begin{pspicture}(-4,-3)(4,3)
\psframe(-4,-3)(4,3)
\psset{lightsrc=viewpoint,SphericalCoor,viewpoint=100
  -30 30,Decran=50}
\IfFileExists{cylindrepointe-sommets.dat}{%
\psSolid[object=datfile,
        fillcolor=red!50,
        file=cylindrepointe]
}{
\psset{solidmemory}
\psSolid[object=datfile,
       file=cylindrebiseau,
       plansepare={[0 -1 1 0]},
       fillcolor=green!50,
       action=none,name=cylindrepointe1]
\psSolid[object=load,
       load=cylindrepointe11,
       plansepare={[0 1 1 0]},
       action=none,name=cylindrepointe2]
\psSolid[object=load,fillcolor=red!50,
       load=cylindrepointe20,action=none,
       file=cylindrepointe,action=writesolid]
\composeSolid
}
\end{pspicture}
```

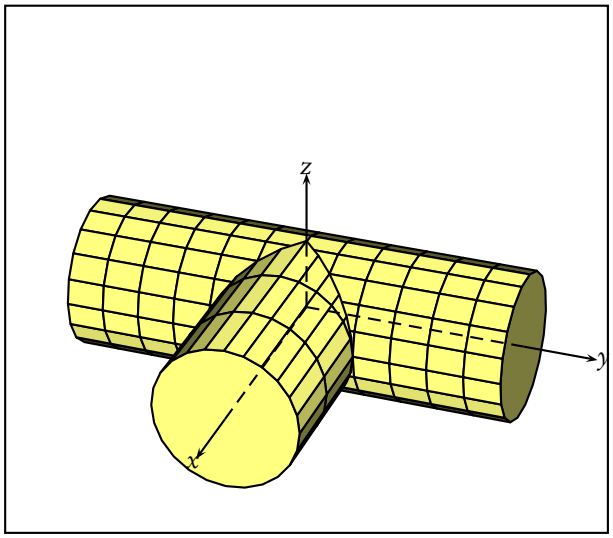
4 Intersection de trois cylindres identiques d'axes orthogonaux

4.1 Le cylindre et sa face concave

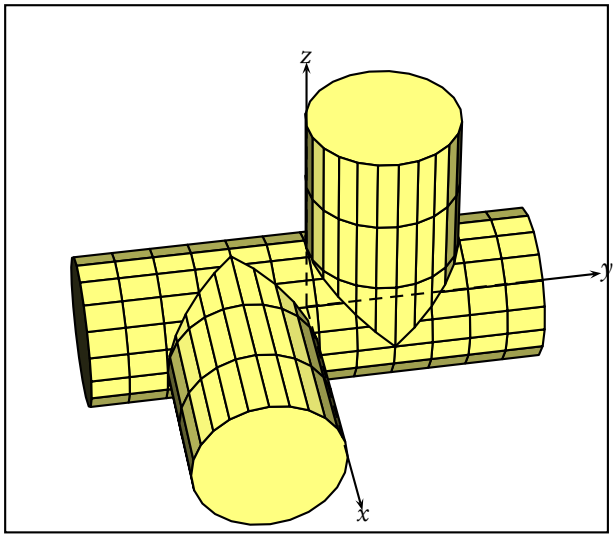


```
\begin{pspicture}(-4,-3)(4,3)
\psframe(-4,-3)(4,3)
\IfFileExists{cylindreconcave-sommets.dat}{%
\psset{lightsrc=viewpoint,SphericalCoor,viewpoint=100
   160 30,Decran=50}
\psSolid[object=datfile,fillcolor=yellow!50,
       file=cylindreconcave]
}{%
\codejps{
% pour enregistrer les données
% du cylindre sans le biseau
% avec la partie enlevée en creux
-6 2 6 [6 24] newcylindre
{0 90 0 rotateOpoint3d} solidtransform
[1 -1 0 0] solidplansepare
/cylindretest1 exch def
/cylindretest0 exch def
cylindretest0
[1 1 0 0] solidplansepare
/cylindretest21 exch def
/cylindretest20 exch def
cylindretest21
dup [0 13] solidrmfaces
dup solidfacesreverse
/faceconcave exch def
faceconcave
{0 0 90 rotateOpoint3d} solidtransform
/faceconcave exch def
cylindretest20
 dup [0 62] solidrmfaces
faceconcave
solidfuz
 (cylindreconcave) writesolidfile
}
}
\end{pspicture}
```

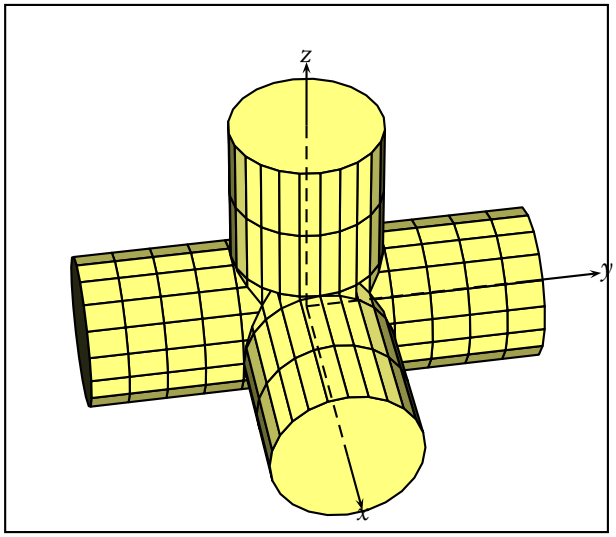
4.2 Raccordement d'un, deux ou trois cylindres sur le cylindre principal



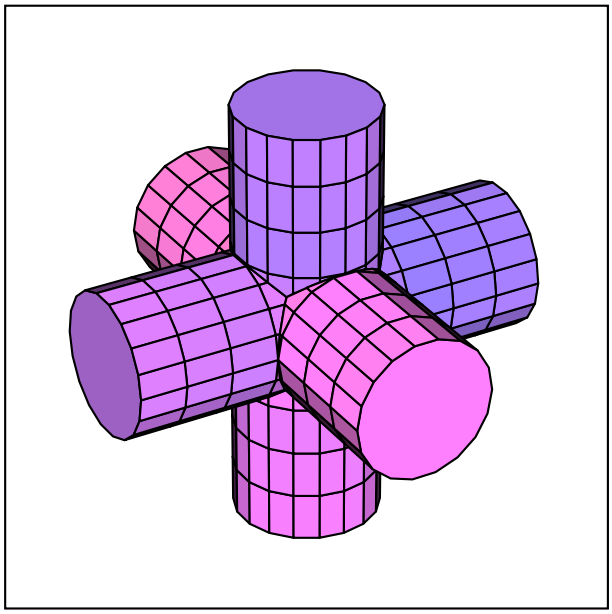

```
\begin{pspicture}(-4,-3)(4,4)
\psframe(-4,-3)(4,4)
\psset{lightsrc=viewpoint,SphericalCoor,viewpoint=100
   20 30,Decran=50}
\psset{solidmemory}
\psSolid[object=cylindre,
   r=2,
   h=12,
   RotX=90,
   fillcolor=yellow!50,
   ngrid=12 18,action=none,
   name=cylindre1](0,6,0)
\psSolid[object=datfile,fillcolor=yellow!50,
       file=cylindreconcave,
       action=none,
       name=cylindrebranche1
       ]
\psSolid[object=fusion,deactivatecolor,
       base=cylindre1 cylindrebranche1]%
\axesIIID(6,6,2)(8,8,4)
\composeSolid
\end{pspicture}
```




```
\begin{pspicture}(-4,-3)(4,4)
\psframe(-4,-3)(4,4)
\psset{lightsrc=viewpoint,SphericalCoor,viewpoint=100
  -10 40,Decran=50}
\psset{solidmemory}
\psSolid[object=cylindre,
   r=2,
   h=12,
   RotX=90,
   fillcolor=yellow!50,
   ngrid=12 18,action=none,
   name=cylindre1](0,6,0)
\psSolid[object=datfile,fillcolor=yellow!50,
       file=cylindreconcave,
       action=none,
       name=cylindrebranche1
       ](0,-2,0)
\psSolid[object=datfile,fillcolor=yellow!50,
       file=cylindreconcave,
       action=none,RotY=-90,
       name=cylindrebranche2
       ](0,2,0)
\psSolid[object=fusion,deactivatecolor,
       base=cylindre1 cylindrebranche2 cylindrebranche
         1]%
\axesIIID(6,6,6)(8,8,8)
\composeSolid
\end{pspicture}
```

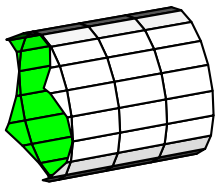



```
\begin{pspicture}(-4,-3)(4,4)
\psframe(-4,-3)(4,4)
\psset{lightsrc=viewpoint,SphericalCoor,viewpoint=100
  -10 40,Decran=50}
\psset{solidmemory}
\psSolid[object=cylindre,
   r=2,
   h=12,
   RotX=90,
   fillcolor=yellow!50,
   ngrid=12 18,action=none,
   name=cylindre1](0,6,0)
\psSolid[object=datfile,fillcolor=yellow!50,
       file=cylindreconcave,
       action=none,
       name=cylindrebranche1
       ](0,0,0)
\psSolid[object=datfile,fillcolor=yellow!50,
       file=cylindreconcave,
       action=none,RotY=-90,
       name=cylindrebranche2
       ](0,0,0)
\psSolid[object=fusion,deactivatecolor,
       base=cylindre1 cylindrebranche2 cylindrebranche
         1]%
\axesIIID(6,6,6)(8,8,8)
\composeSolid
\end{pspicture}
```



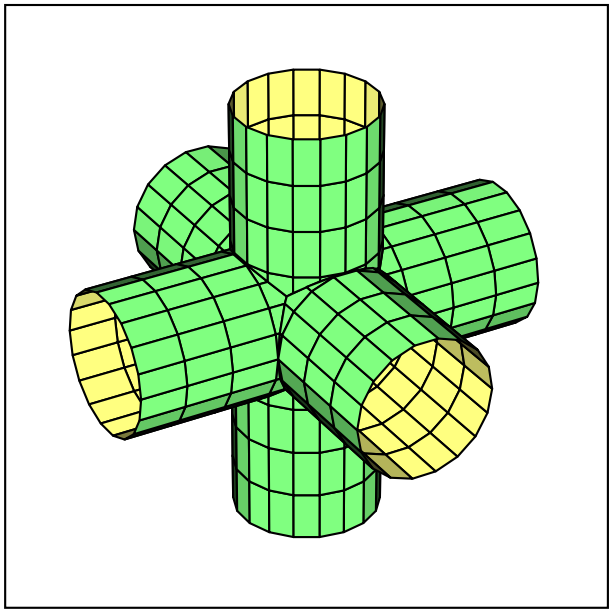
```
\begin{pspicture}(-4,-4)(4,4)
\psframe(-4,-4)(4,4)
\IfFileExists{3cylindrespleins-sommets.dat}{%
\psset{lightsrc=viewpoint,SphericalCoor,viewpoint=100
  -30 30,Decran=50}
\psSolid[object=datfile,hue=0.7 0.9 0.5 1,
       file=3cylindrespleins]
}{%
\psset{solidmemory}
\psSolid[object=datfile,
       file=cylindrepointe,
       action=none,
       name=cylindre1]
\psSolid[object=datfile,
       RotX=90,
       file=cylindrepointe,
       action=none,
       name=cylindre2]
\psSolid[object=datfile,
       RotX=180,
       file=cylindrepointe,
       action=none,
       name=cylindre3]
\psSolid[object=datfile,
       RotX=270,
       file=cylindrepointe,
       action=none,
       name=cylindre4]
\psSolid[object=datfile,
       RotZ=-90,
       file=cylindrepointe,
       action=none,
       name=cylindre5]
\psSolid[object=datfile,
       RotZ=90,
       file=cylindrepointe,
       action=none,
       name=cylindre6]
\psSolid[object=fusion,
       base=cylindre1 cylindre2
            cylindre3 cylindre4
            cylindre5 cylindre6,
            file=3cylindrespleins,action=writesolid]
\composeSolid
}
\end{pspicture}
```

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



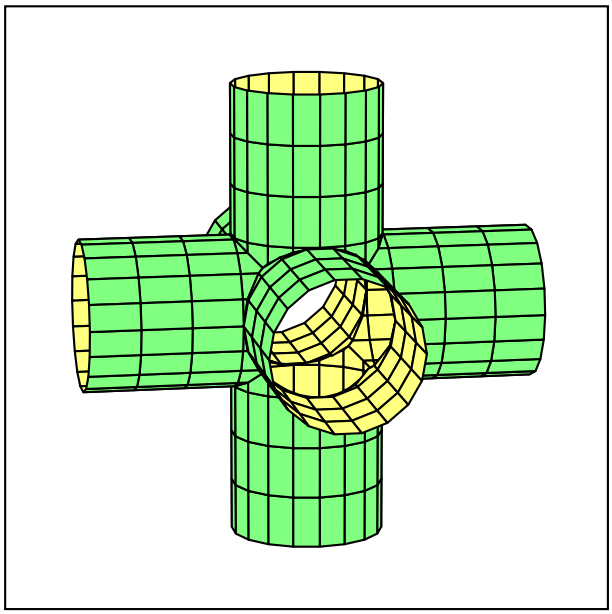
```
\begin{pspicture}(-4,-3)(4,4)
%\psframe(-4,-3)(4,4)
\psset{solidmemory}
\psset{lightsrc=viewpoint,SphericalCoor,viewpoint=100
  -20 30,Decran=50}
\psSolid[object=datfile,
       file=cylindrepointe,
 %       numfaces=all
       rm=0 1 2 75 76,
       name=cylindrepointeevide1,
       action=none]
\psSolid[object=load,
       load=cylindrepointeevide1,
       file=cylindrepointeevide,
       action=writesolid]
\psSolid[object=datfile,
       file=cylindrepointeevide,
       hollow
       ]
 \composeSolid
\end{pspicture}
```

4.4 Intersection des 3 cylindres d'axes orthogonaux

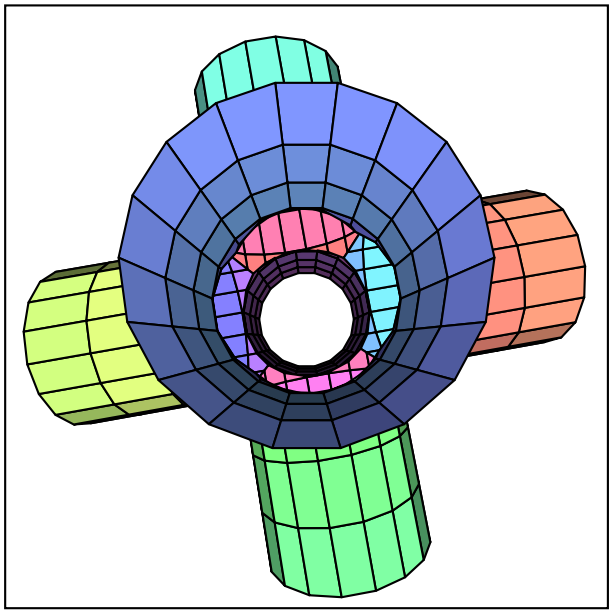


```
\begin{pspicture}(-4,-4)(4,4)
\psframe(-4,-4)(4,4)
\psset{lightsrc=viewpoint,SphericalCoor,viewpoint=100
  -30 30,Decran=50}
\IfFileExists{3cylindrescreux-sommets.dat}{%
\psSolid[object=datfile,deactivatecolor,
        file=3cylindrescreux]
}{
\psset{solidmemory}
\psSolid[object=datfile,
        file=cylindrepointeevide,
        incolor=yellow!50,
        fillcolor=green!50,
        hollow,
        action=none,
        name=cylindre1]
\psSolid[object=datfile,
        RotX=90,
        file=cylindrepointeevide,
        incolor=yellow!50,
        fillcolor=green!50,
        hollow,
        action=none,
        name=cylindre2]
\psSolid[object=datfile,
        RotX=180,
        file=cylindrepointeevide,
        incolor=yellow!50,
        fillcolor=green!50,
        hollow,
        action=none,
        name=cylindre3]
\psSolid[object=datfile,
        RotX=270,
        file=cylindrepointeevide,
        incolor=yellow!50,
        fillcolor=green!50,
        hollow,
        action=none,
        name=cylindre4]
\psSolid[object=datfile,
        RotZ=-90,
        file=cylindrepointeevide,
        incolor=yellow!50,
        fillcolor=green!50,
        hollow,
        action=none,
        name=cylindre5]
\psSolid[object=datfile,
        RotZ=90,
        file=cylindrepointeevide,
        incolor=yellow!50,
        fillcolor=green!50,
        hollow,
        action=none,
        name=cylindre6]
\psSolid[object=fusion,%deactivatecolor,
        base=cylindre1 cylindre2
             cylindre3 cylindre4
             cylindre5 cylindre6,
             file=3cylindrescreux,action=writesolid]
\composeSolid
}
\end{pspicture}
```

4.5 Une vue rapprochée

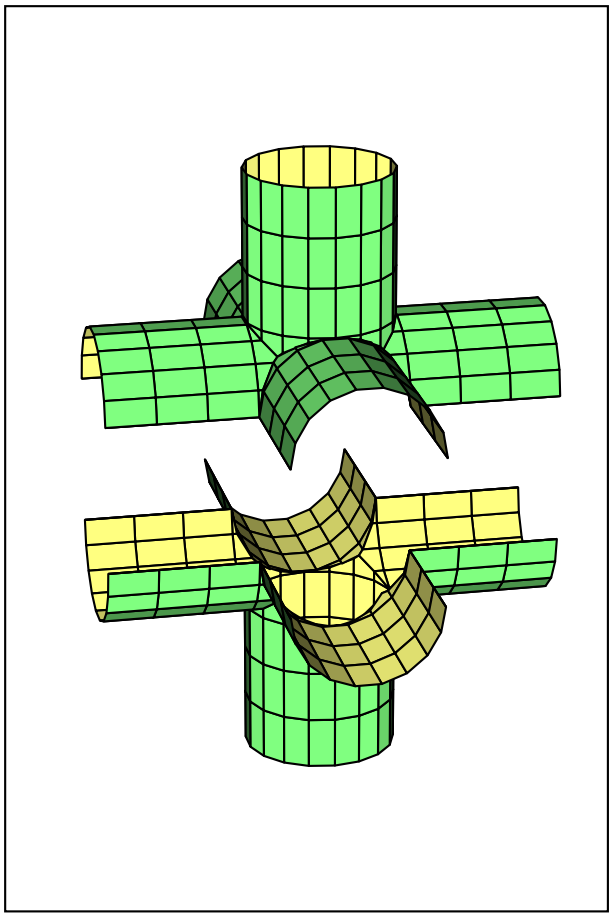


```
\begin{pspicture}(-4,-4)(4,4)
\psframe(-4,-4)(4,4)
\psset{SphericalCoor,viewpoint=100 -10 12,Decran=50}
\psSolid[object=datfile,deactivatecolor,
        file=3cylindrescreux]
\end{pspicture}
```



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

4.6 Séparation par le plan de symétrie horizontal



```
\begin{pspicture}(-4,-6)(4,6)
\psframe(-4,-6)(4,6)
\psset{lightsrc=viewpoint,SphericalCoor,viewpoint=100
  -12 20,Decran=50}
\psset{solidmemory}
\psSolid[object=datfile,
        file=3cylindresevides,
        plansepare={[0 0 1 0]},
        action=none,
        name=3cylindresevidesdivision]
\psSolid[object=load,hollow,
        incolor=yellow!50,
        fillcolor=green!50,
        load=3cylindresevidesdivision1](0,0,-2)
\psSolid[object=load,hollow,
        incolor=yellow!50,
        fillcolor=green!50,
        load=3cylindresevidesdivision0](0,0,2)
\composeSolid
\end{pspicture}
```