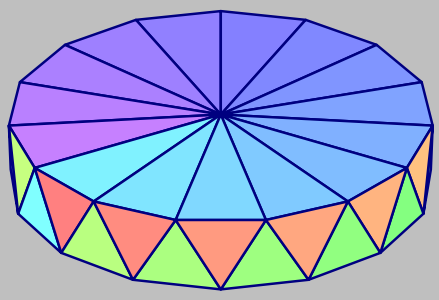
PSTricks

pst-antiprism: Drawing an antiprism

v.0.02

February 13, 2018



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Contents

1 Introduction

An antiprism is a semiregular polyhedron constructed with 2 n-gons and 2n triangles. The nets are particularly simple, consisting of two n-gons on top and bottom, separated by a ribbon of 2n triangles, with the two n-gons being offset by one ribbon segment. The duals of the antiprisms are the trapezohedra. [5]

The macro `\psAntiprism` has the following syntax:

```
\psAntiprism[Options]
```

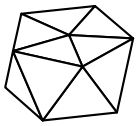
The special optional arguments with its default values are

name	*default*	*description*
`n`	8	number of the edges of the polygon
`a`	1	the radius of the outer polygon circle
`meshbases`	true	A boolean to mesh the bases with triangles whose one vertex is the center of the base and the two other two consecutive vertices of the polygon of the base.
`colored`	false	A boolean which will color the antiprism. This is only possible with `meshbases=true`. The bases of the triangles allow a coloration by continuity of a triangle of the periphery of the antiprisme and the corresponding triangle of the base. It is an adaptation of the idea of H. B. Meyer for hexagonal antiprism. [2]
`fan`	false	draw the antiprism as a fan.

2 Examples

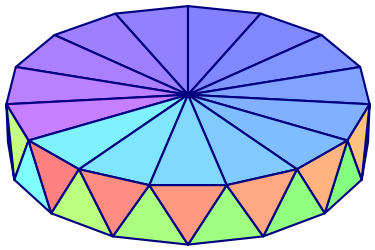
2.1 The default behaviour

For `viewpoint` and `Decran` see the documentation of `pst-solides3d`. [3]

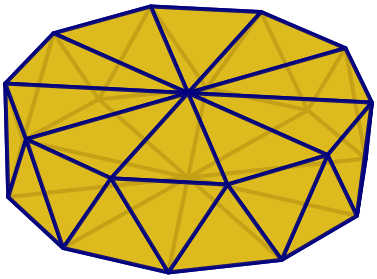


```
\begin{pspicture}(-3,-3)(3,3)
\psset{viewpoint=100 60 30 rtp2xyz,Decran=100}
\psAntiprism
\end{pspicture}
```

2.2 Using the optional arguments



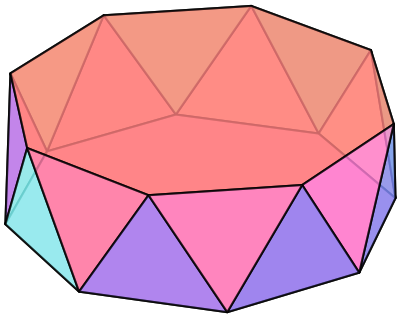
```
\begin{pspicture}(-3,-3)(3,3)
\psset{viewpoint=100 60 30 rtp2xyz,Decran=100}
\psAntiprism[a=1,n=15,hue=0 1 0.5 1,
          linecolor={[rgb]{0 0 0.5}}]
\end{pspicture}
```



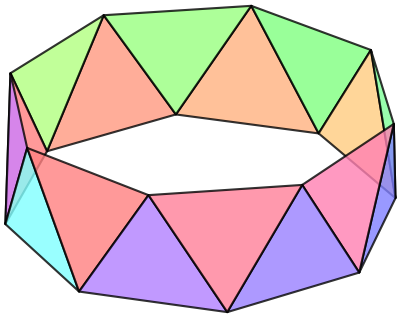
```
\begin{pspicture}(-3,-3)(3,3)
\psset{viewpoint=100 60 30 rtp2xyz,Decran=75}
\psAntiprism[a=2,n=10,fillcolor=Miel,hollow,incolor=
    yellow!20,
          linecolor={[rgb]{0 0 0.5}},
          linewidth=1.5pt,
          opacity=0.9]
\end{pspicture}
```

2.3 No lines for the base triangles: option `meshbases=false`

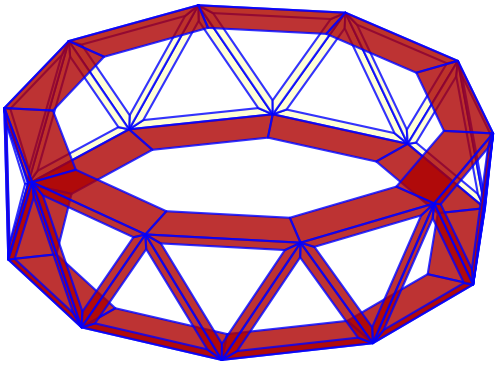
In this case, the 2 bases have the numbers 0 and 1 and we can delete them with the optional argument setting `rm=0 1`.



```
\begin{pspicture}(-3,-3)(3,3)
\psset{viewpoint=100 60 30 rtp2xyz,Decran=100}
\psAntiprism[a=2,n=8,inouthue=1 0 0.5 1,
          meshbases=false,hollow,
          opacity=0.8]
\end{pspicture}
```



```
\begin{pspicture}(-3,-3)(3,3)
\psset{viewpoint=100 60 30 rtp2xyz,Decran=100}
\psAntiprism[a=2,n=8,inouthue=1 0 0.5 1,
          meshbases=false,numfaces=,hollow,
          opacity=0.8,rm=0 1,affinage=]
\end{pspicture}
```

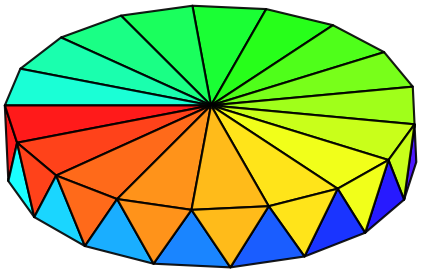


```
\begin{pspicture}(-3,-3)(3,3)
\psset{viewpoint=100 60 30 rtp2xyz,Decran=100}
\psAntiprism[a=2,n=10,fillcolor=Maroon,
          incolor=yellow!20,
          linecolor=blue,
          meshbases=false,hollow,
          opacity=0.8,affinage=all]
\end{pspicture}
```

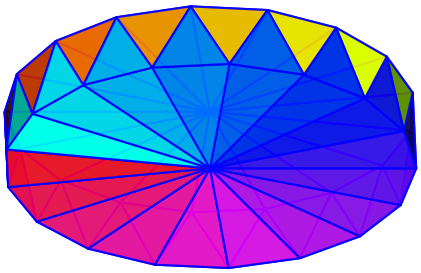
3 Colored anitpriam

This behaviour needs the setting `meshbases=true` and `colored=true`.

It allows coloring by continuity of a triangle around the antiprism and the corresponding triangle of the base. The other options didn't changed its meaning.



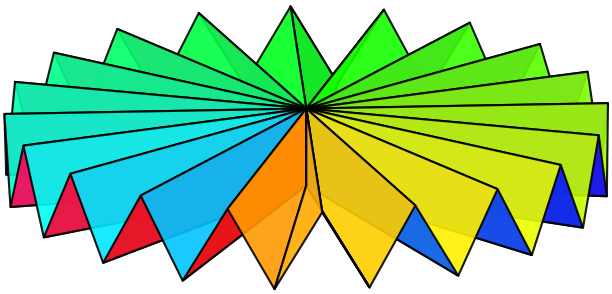
```
\begin{pspicture}(-3,-3)(3,3)
\psset{viewpoint=100 90 30 rtp2xyz,Decran=100}
\psset{a=1,r=1}
\psAntiprism[colored,n=17]
\end{pspicture}
```



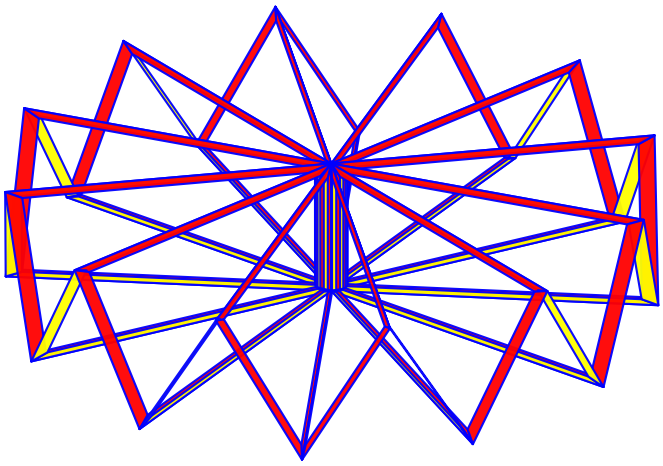
```
\begin{pspicture}(-3,-3)(3,3)
\psset{viewpoint=100 90 -30 rtp2xyz,Decran=100}
\psset{lightsrc=viewpoint}
\psset{a=1,r=1,hollow,opacity=0.8,linecolor=blue}
\psAntiprism[colored,n=17]
\end{pspicture}
```

4 An antiprism as a fan

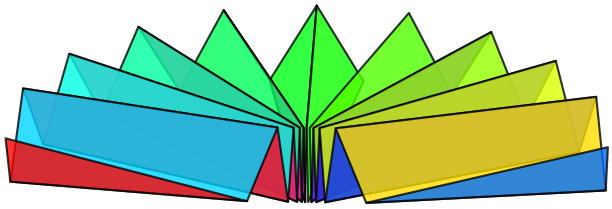
With the optional argument `fan` the antiprism can be drawn like a fan:



```
\begin{pspicture}(-4.5,-2.5)(4.5,2.5)
\psset{viewpoint=200 15 20 rtp2xyz,
  Decran=500}
\psAntiprism[fan,a=0.5,n=20,
  inouthue=0.1 1,hollow,opacity=0.9]
\end{pspicture}
```



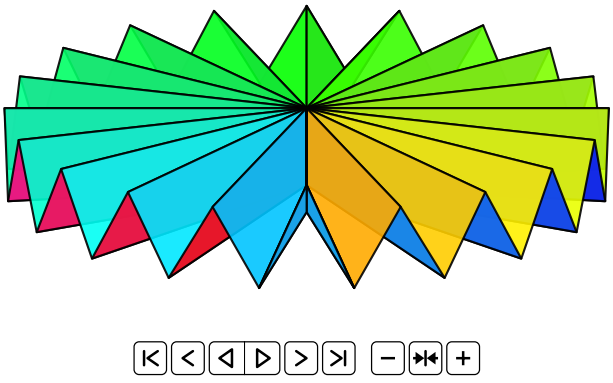
```
\begin{pspicture}(-4.5,-3)(4.5,3)
\psset{viewpoint=100 20 30 rtp2xyz,
  Decran=150}
\psAntiprism[fan,n=12,a=1.5,hollow,
  incolor=yellow,fillcolor=red,
  linecolor=blue,opacity=0.95,
  affinage=all,affinagecoeff=0.9]
\end{pspicture}
```



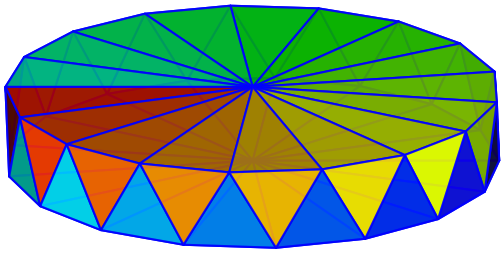
```
\begin{pspicture}(-4.5,-3)(4.5,3)
\psset{viewpoint=200 2 25 rtp2xyz,
 Decran=500,solidmemory}
\psAntiprism[fan,n=20,a=0.5,hollow,
 inouthue=0.1 1,opacity=0.9,
 plansepare={[1 0 0 0.05]},
 name=eventail,action=none]
\psSolid[object=load,load=eventail1,
 deactivatecolor,hollow,opacity=0.8]
\end{pspicture}
```

4.1 animation

With the package `animate` one can create inline animations in an easy way:



```
\begin{animateinline}[controls,loop,
               begin={\begin{pspicture}(-4.5,-2.5)(4.5,2.5)},
               end={\end{pspicture}}]{12}% 25 images/s
\multiframe{72}{iTheta=0+5}{%
\psset{viewpoint=200 \iTheta\space 20 rtp2xyz,
 Decran=500}
\psAntiprism[fan,a=0.5,n=20,inouthue=0.1 1,hollow,opacity=0.9]}
\end{animateinline}
```



```
\begin{animateinline}[controls,loop,
                begin={\begin{pspicture}(-4,-4)(4,4)},
                end={\end{pspicture}}]{12}% 25 images/s
\multiframe{72}{iTheta=0+5}{%
\psset{viewpoint=100 90 20 rtp2xyz,Decran=120}
\psset{lightsrc=viewpoint}
\psset{a=1,r=1,hollow,opacity=0.8,linecolor=blue,RotSequence=zxy,RotX=\iTheta,RotZ=\iTheta
    }
\psAntiprism[colored,n=17]}
\end{animateinline}
```

5 List of all optional arguments for pst-antiprism

Key	Type	Default
n	ordinary	[none]
meshbases	boolean	true
colored	boolean	true
fan	boolean	true

References

[1] Michel Goosens et al. *The LaTeX Graphics Companion*. 2nd ed. Boston, Mass.: Addison-Wesley Publishing Company, 2007.

[2] Hans-Bernhard Meyer. *Hexagonal antiprism*. URL: http://www.hbmeyer.de/flechten/ap6/indexeng.html (visited on 02/12/2018).

[3] Jean-Paul Vignault et al. *pst-solides3d – The Basics*. Aug. 23, 2017. URL: /graphics/pstricks/contrib/pst-solides3d/ (visited on 02/12/2018).

[4] Herbert Voß. *PSTricks – Graphics and PostScript for LaTeX*. 1st ed. Cambridge – UK: UIT, 2011.

[5] Eric Weisstein. *Antiprism*. URL: http://mathworld.wolfram.com/Antiprism.html (visited on 02/12/2018).

Index