pst-antiprism: Drawing an antiprism

v.0.02

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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

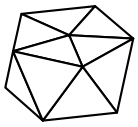
name	*default*	*description*
n	8	number of the edges of the polygon
a	1	the radius of the outer polygon circle
meshbases	true	A boolean to mesh the bases with triangles whose one vertex is the center of the base and the two other two consecutive vertices of the polygon of the base.
colored	false	A boolean 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

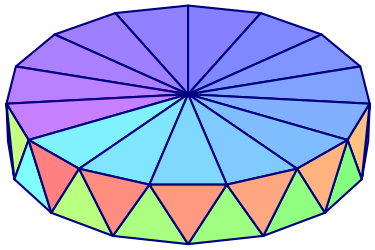
2.1 The default behaviour

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

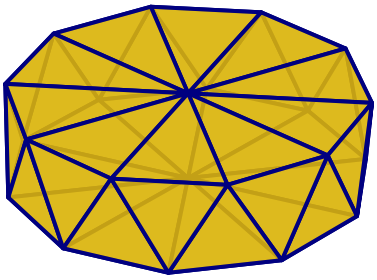


```
\begin{pspicture}(-3,-3)(3,3)
\psset{viewpoint=100 60 30 rtp2xyz,Decran=100}
\psAntiprism
\end{pspicture}
```

2.2 Using the optional arguments



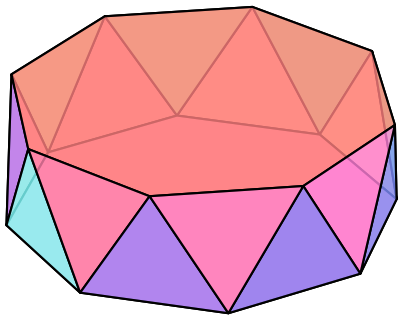
```
\begin{pspicture}(-3,-3)(3,3)
\psset{viewpoint=100 60 30 rtp2xyz,Decran=100}
\psAntiprism[a=1,n=15,hue=0 1 0.5 1,
          linecolor={[rgb]{0 0 0.5}}]
\end{pspicture}
```



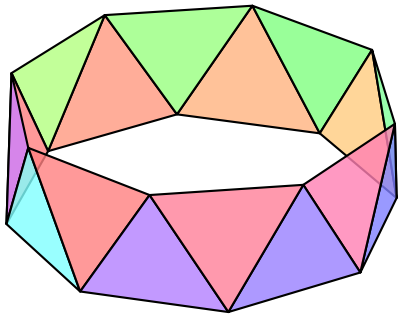
```
\begin{pspicture}(-3,-3)(3,3)
\psset{viewpoint=100 60 30 rtp2xyz,Decran=75}
\psAntiprism[a=2,n=10,fillcolor=Miel,hollow,incolor=yellow!20,
          linecolor={[rgb]{0 0 0.5}},
          linewidth=1.5pt,
          opacity=0.9]
\end{pspicture}
```

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

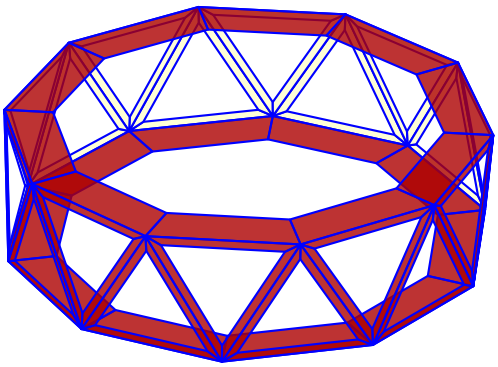
In this case, the 2 bases have the numbers 0 and 1 and we can delete them with the optional argument setting `rm=0 1`.



```
\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}
```

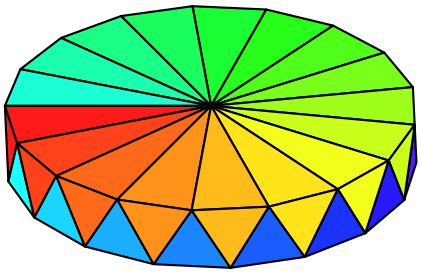


```
\begin{pspicture}(-3,-3)(3,3)
\psset{viewpoint=100 60 30 rtp2xyz,Decran=100}
\psAntiprism[a=2,n=10,fillcolor=Maroon,
          incolor=yellow!20,
          linecolor=blue,
          meshbases=false,hollow,
          opacity=0.8,affinage=all]
\end{pspicture}
```

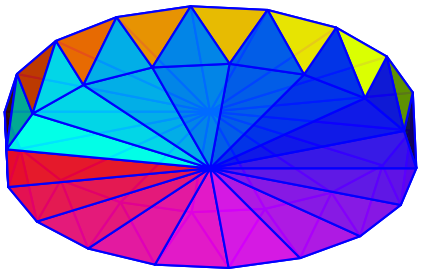
3 Colored anitpriam

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.



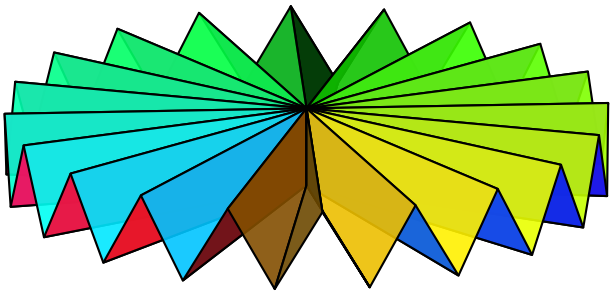
```
\begin{pspicture}(-3,-3)(3,3)
\psset{viewpoint=100 90 30 rtp2xyz,Decran=100}
\psset{a=1,r=1}
\psAntiprism[colored,n=17]
\end{pspicture}
```



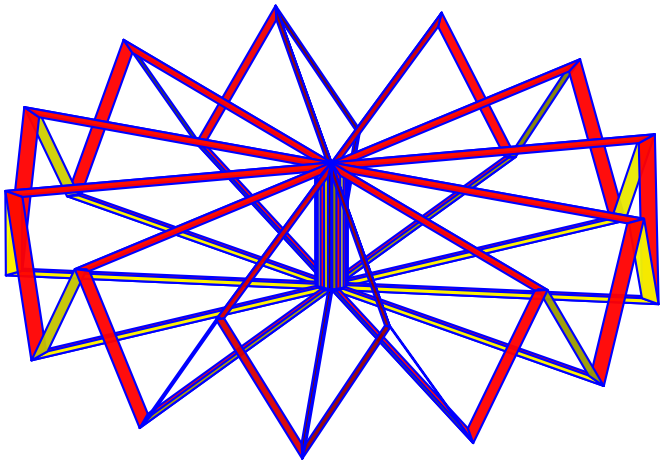
```
\begin{pspicture}(-3,-3)(3,3)
\psset{viewpoint=100 90 -30 rtp2xyz,Decran=100}
\psset{lightsrc=viewpoint}
\psset{a=1,r=1,hollow,opacity=0.8,linecolor=blue}
\psAntiprism[colored,n=17]
\end{pspicture}
```

4 An antiprism as a fan

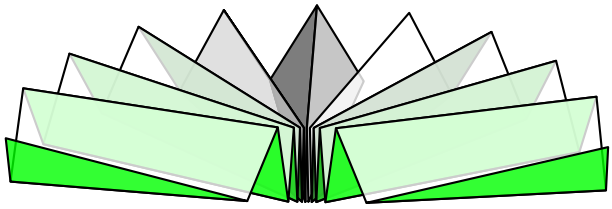
With the optional argument `fan` the antiprism can be drawn like a fan:



```
\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}
```



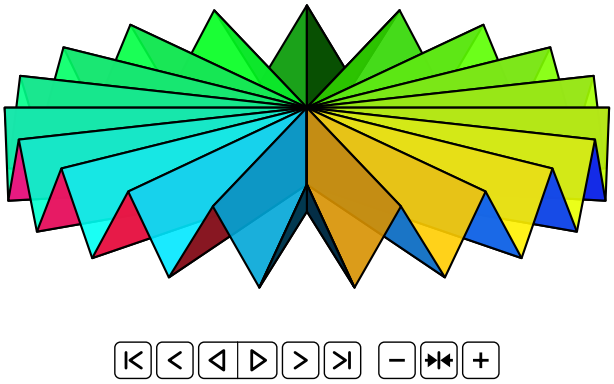
```
\begin{pspicture}(-4.5,-3)(4.5,3)
\psset{viewpoint=100 20 30 rtp2xyz,
  Decran=150}
\psAntiprism[fan,n=12,a=1.5,hollow,
  incolor=yellow,fillcolor=red,
  linecolor=blue,opacity=0.95,
  affinage=all,affinagecoeff=0.9]
\end{pspicture}
```



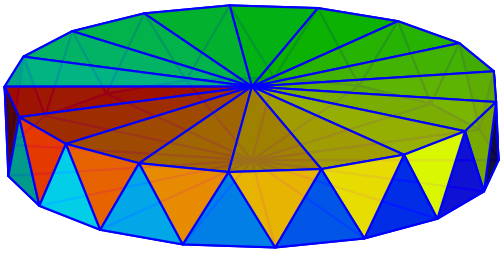
```
\begin{pspicture}(-4.5,-3)(4.5,3)
\psset{viewpoint=200 2 25 rtp2xyz,
 Decran=500,solidmemory}
\psAntiprism[fan,n=20,a=0.5,hollow,
 inouthue=0.1 1,opacity=0.9,
 plansepare={[1 0 0 0.05]},
 name=eventail,action=none]
\psSolid[object=load,load=eventail1,
 deactivatecolor,hollow,opacity=0.8]
\end{pspicture}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

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 **andothers**. *The LaTeX Graphics Companion*. 2 **edition**. Boston, Mass.: Addison-Wesley Publishing Company, 2007.

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

[3] Jean-Paul Vignault **andothers**. *pst-solides3d – The Basics*. 23 **august** 2017. URL: /graphics/pstricks/contrib/pst-solides3d/ (**urlseen** 12/02/2018).

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

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

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