pst-antiprism: Drawing an antiprism

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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

<table>
<thead>
<tr>
<th>name</th>
<th>default</th>
<th>description</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>8</td>
<td>number of the edges of the polygon</td>
</tr>
<tr>
<td>a</td>
<td>1</td>
<td>the radius of the outer polygon circle</td>
</tr>
<tr>
<td>meshbases</td>
<td>true</td>
<td>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.</td>
</tr>
<tr>
<td>colored</td>
<td>false</td>
<td>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]</td>
</tr>
<tr>
<td>fan</td>
<td>false</td>
<td>draw the antiprism as a fan.</td>
</tr>
</tbody>
</table>

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 $rm=0 1$.
3 Colored antiprism

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.
4 An antiprism as a fan

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

\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}

\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}
4 An antiprism as a fan

4.1 animation

With the package \texttt{animate} one can create inline animations in an easy way:
4 An antiprism as a fan

\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,linestyle=blue,RotSequence=zxy,RotX=iTheta,RotZ=iTheta} 
\psAntiprism[colored,n=17] 
\end{animateinline}
### 5 List of all optional arguments for \texttt{pst-antiprism}

<table>
<thead>
<tr>
<th>Key</th>
<th>Type</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>\texttt{n}</td>
<td>ordinary</td>
<td>[none]</td>
</tr>
<tr>
<td>meshbases</td>
<td>boolean</td>
<td>true</td>
</tr>
<tr>
<td>colored</td>
<td>boolean</td>
<td>true</td>
</tr>
<tr>
<td>fan</td>
<td>boolean</td>
<td>true</td>
</tr>
</tbody>
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