Making PostScript Figures with KnotPlot

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1   Introduction

KnotPlot can export PostScript in numerous flavours, however for the purposes of illustrating knot theory papers, only a few are needed. The KnotPlot command to export PostScript is psout and the most important KnotPlot parameter is psmode. psmodes 40 and 41 correspond to two traditional methods for drawing knots commonly seen in mathematical documents. KnotPlot writes Encapsulated PostScript (EPS), which doesn't quite follow Adobe's Document Structuring Conventions (some day it will). This shouldn't be an issue for most software that imports EPS figures. For example LaTeX and Adobe Illustrator and Photoshop import EPS from KnotPlot perfectly well.

2   Basic examples

In the following examples, it is assumed that KnotPlot is in a reasonable state when the commands are issued. If you find you get different results, try entering reset all before trying the examples.
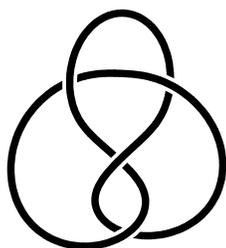


psout with psmode = 40   psout with psmode = 41   psout in beads & cyls mode
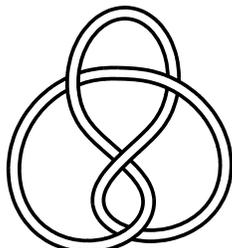
The next example shows the use of the pserase parameter. This controls how much white space is erased when drawing the knot.
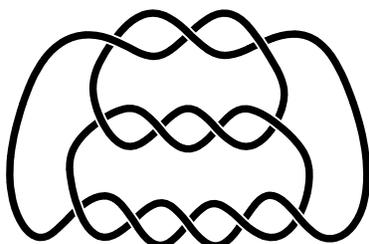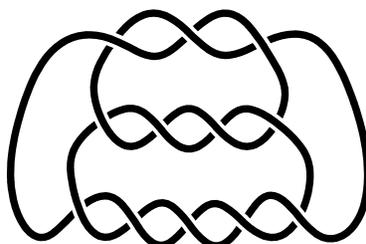


pserase=1.5   pserase=2 (the default)   pserase=3
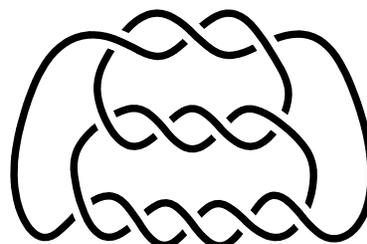
Often if the figure is small, a larger value of pserase gives better results. Compare the above three pretzel knots at a width of 3pc:


1.5   2   3
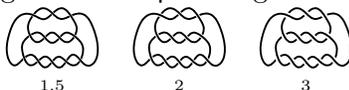
You can draw the shadow of the knot by setting pserase to any positive value less than 1, as in these examples
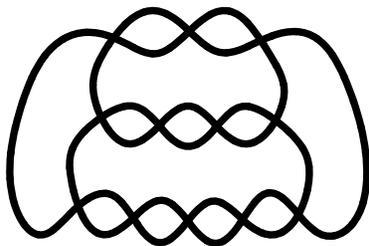
pserase=0
cyl=.7 (as above)
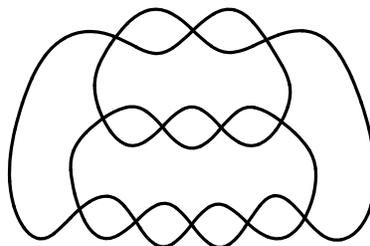
pserase=0
cyl=.3
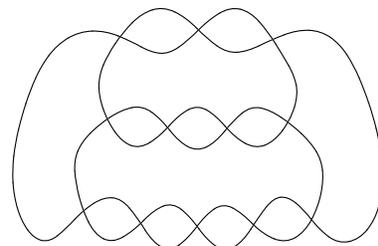
pserase=0
cyl=.1

3   Bounding boxes

EPS figures include a `BoundingBox` line that indicates the extent of the figure on the page, in PostScript coordinates.[1] KnotPlot by default scales PostScript images so that they are centered on the page and of maximal size, while preserving aspect ratio. This allows users to directly print a KnotPlot EPS figures, for example, by issuing a command such as `lpr psout.eps` (in UNIX). Also by default, the bounding box is the smallest square including the knot figure. This can be changed by using the `psoption` command,
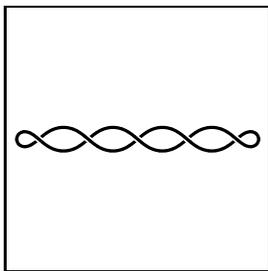
using `psop bbox square` (the default)

using `psop bbox smallest`
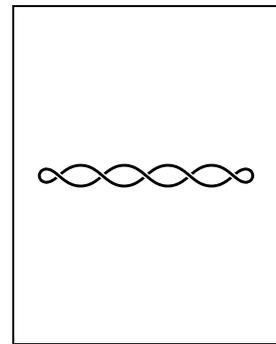
using `psop bbox fullpage`

Some random examples using `psop smallest`:
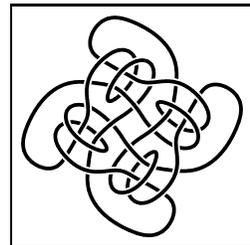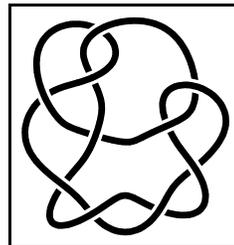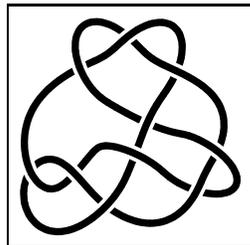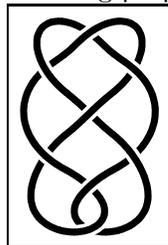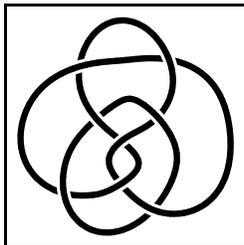

4   Bounding box tricks

The bounding box is normally set (in KnotPlot units) to a box just bounding the knot, plus a little extra to include the string thickness. However, it is often useful to trick KnotPlot (and TeX) into using a different bounding box than one that actually bounds the knot. These are called *phantom bounding boxes* and are good for all sorts of tricks.

This is useful if you want a number of knot images to appear at a consistent scale, as in the following

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[1]In *points*, there are exactly 72 PostScript points to the inch, not the 72.027 points to the inch that TeX uses.

figures where each knot is scaled to the same length and thickness. If we use the default bounding boxes, we get the following result:
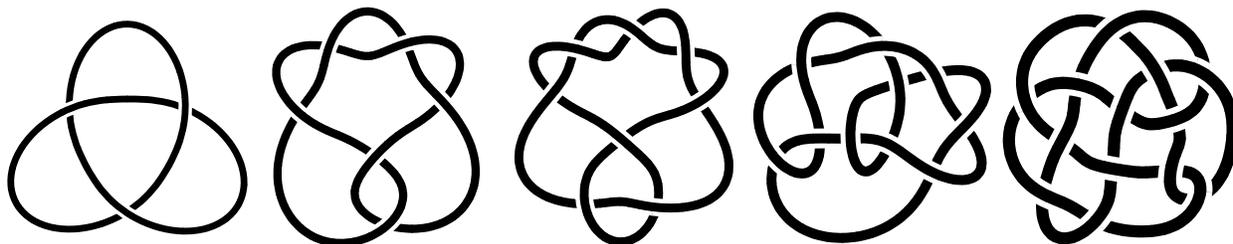
Using a phantom bounding box, we get
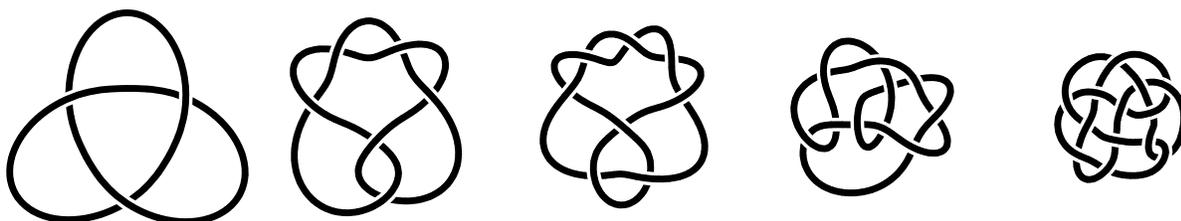
which better illustrates the fact that more complicated knots are smaller (using the same piece of "rope").

5 Colour examples

Colour PostScript pictures can also be created. The colours follow those seen in the KnotPlot view window,

psmode=44   psmode=45   psmode=44   psmode=45
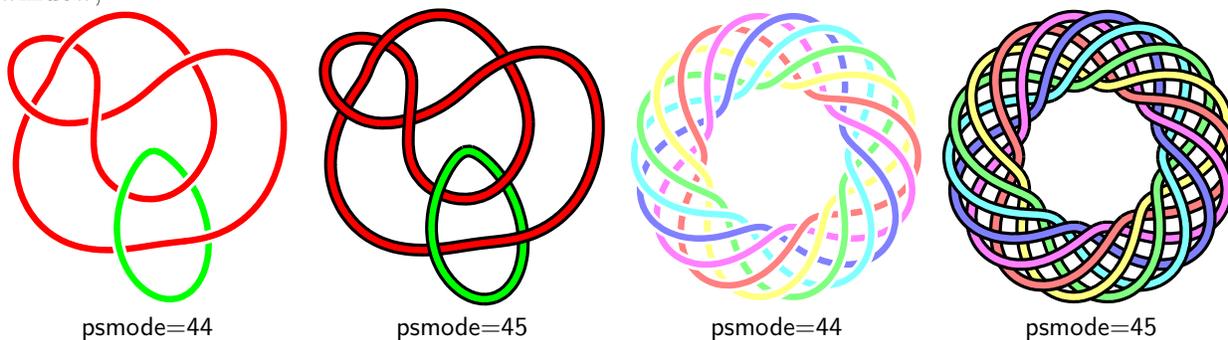
6 Online examples

Many examples of PostScript figures, complete with the KnotPlot scripts that generated them can be found at the web page knotplot.com/postscript