



Making PostScript Figures with KnotPlot

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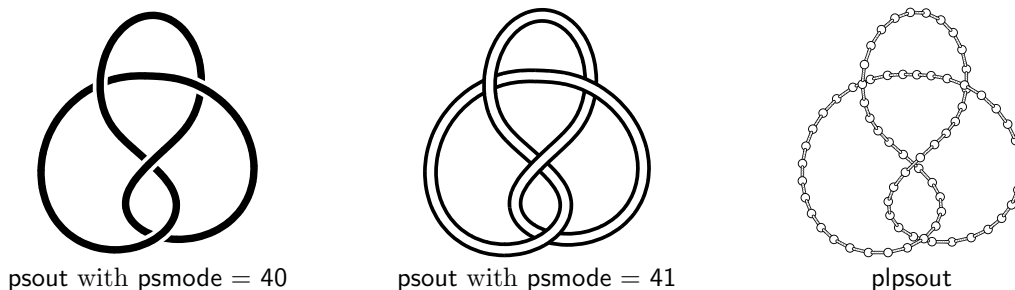
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1 Introduction

KnotPlot can export PostScript in numerous flavours, however for the purposes of illustrating knot theory papers, only a few are needed. The KnotPlot commands to export PostScript are `psout` and `plpsout` and the most important KnotPlot parameter is `psmode`. The `psout` command corresponds to the “Smooth Tubes” display mode in KnotPlot, and the `plpsout` to “Beads & Sticks”. 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.

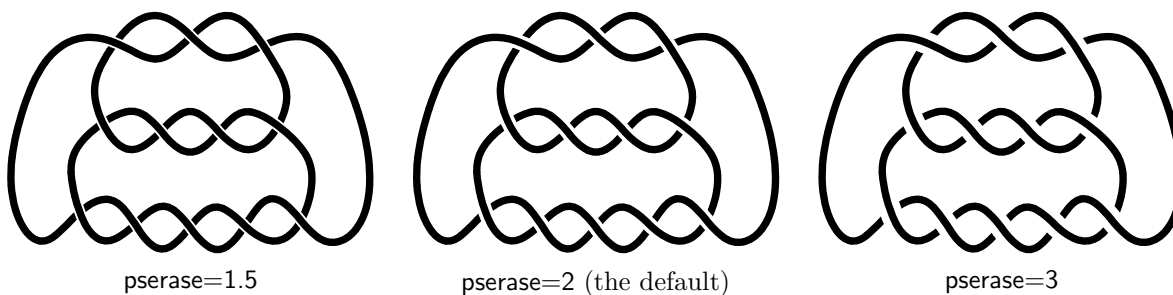
2 Basic examples

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.

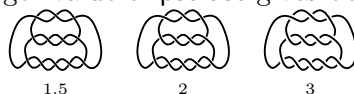


KnotPlot had a long lasting problem that it would output poor quality pictures for knots that had few beads. This deficiency has been removed as of KnotPlot Build Number 3195. Make sure your KnotPlot’s Build Number is at least this, otherwise you may have to use the `refine` command before outputting PostScript.¹

The next example shows the use of the `pserase` parameter. This controls how much white space is erased when drawing the knot.

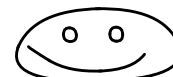


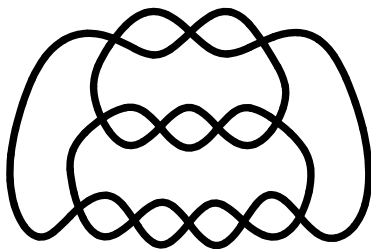
Often if the figure is small, a larger value of `pserase` gives better results. Compare the above three pretzel knots at a width of 3pc:



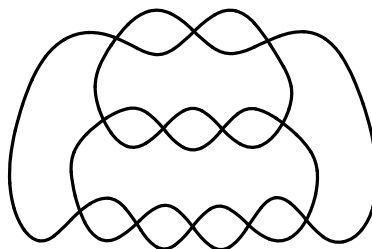
You can draw the shadow of the knot by setting `pserase` to any positive value less than 1, as in these examples

¹You can check the Build Number of KnotPlot by using the `version` command. The curves in

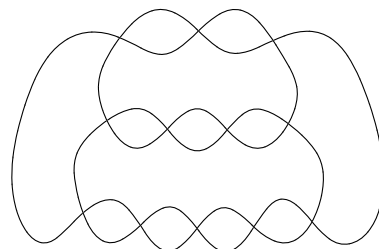




pserase=0
cyl=.7 (as above)



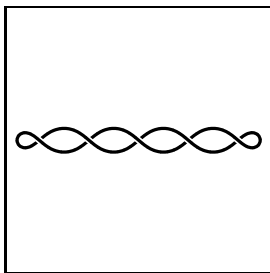
pserase=0
cyl=.3



pserase=0
cyl=.1

3 Bounding boxes

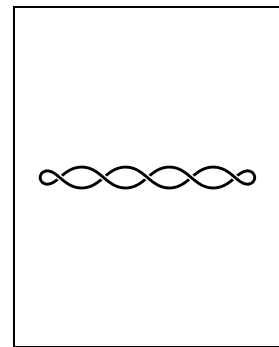
EPS figures include a `BoundingBox` line that indicates the extent of the figure on the page, in PostScript coordinates.² KnotPlot by default scales PostScript images so that they are centered on the page and of maximal size, while preserving aspect ratio. This allows users to directly print a KnotPlot 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)

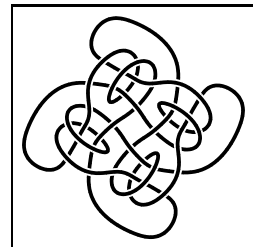
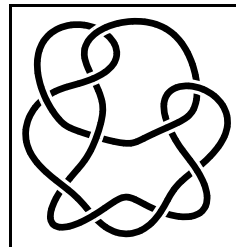
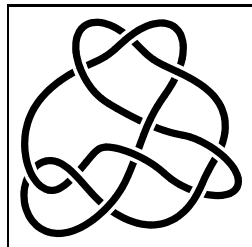
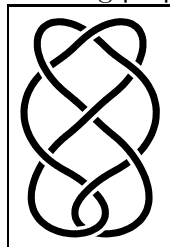
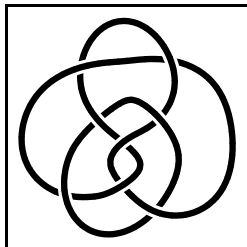


using `psop bbox smallest`



using `psop bbox fullpage`

Some random examples using `psop smallest`:



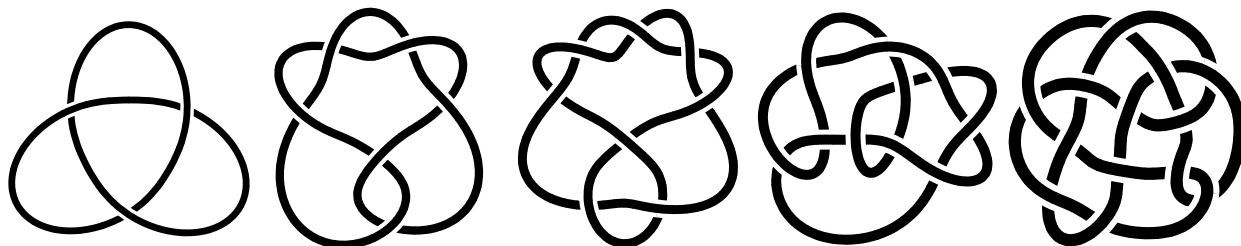
4 Bounding box tricks

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.

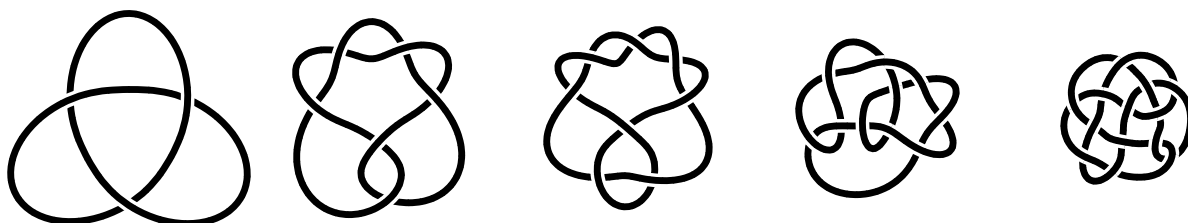
This is useful if you want a number of knot images to appear at a consistent scale, as in the following

²In *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 the colours seen in the KnotPlot view window,

