

TopoIce-X Manual

This program finds all rational knots up to 13 crossings of crossing distance one from a given rational knot and also shows all topologically different ways to convert that rational knot to another rational knot via a crossing change.

Download KnotPlot from <http://www.pims.math.ca/knotplot/download.html>

PC. To download KnotPlot: Click on InstallKnotPlot.exe. This will open a window asking you if you want to run, save, or cancel this file. Click on run (or save if you prefer). After it is downloaded, you will be asked if you wish to run the program. Click on run and follow the KnotPlot Setup Wizard instructions.

MAC. Click on KnotPlot.tar.gz. If you have Stuffit, the compressed KnotPlot directory will be automatically uncompressed. Otherwise you can use `tar -xvzf KnotPlot.tar.gz` on any command line terminal (such as X11 or Terminal).

Linux. Use `gunzip` to unzip.

You need to download `tDistvalues2.gz` separately.

Unzip `tDistvalues2.gz`.

On a Windows machine, you can use WinZip.

On a Mac, Stuffit will automatically uncompress it. If you don't have stuff it, you can use `gunzip tDistvalues2.gz` on any command line terminal.

On linux: `gunzip tDistvalues2.gz`

Put `tDistvalues2` in the same folder as the KnotPlot executable. For example, if you downloaded KnotPlot to `C: Program Files/KnotPlot`, put `tDistvalues2` in the folder (`C: Program Files/KnotPlot`)

Click on the KnotPlot icon (in KnotPlot folder or on Desktop if you created a Desktop KnotPlot icon) to run KnotPlot:



In the KnotPlot Control Panel window, click on the TopoICE tab (in second column).



At the bottom, you will see two grey boxes. Click on the box marked " \rightarrow TopoICE-X"



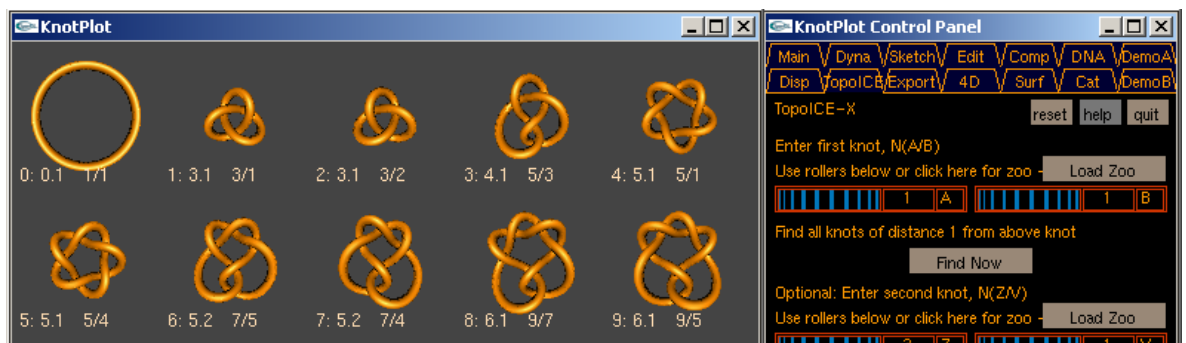
To use the topoisomerase capability of KnotPlot:

Enter a knot by using the zoo or rollers:



To enter a knot using the zoo, click on "Load Zoo".

A zoo of knots will appear in the KnotPlot Window. You can enter a knot by clicking on it.



You can display more knots by using the slider to change the zoo size or clicking on "Zoo up" or "Zoo down".



There are two display modes:

If "cat" zoo mode is selected, Rolfsen type pictures of knots will display.

If "rat" zoo mode is selected, the knot is drawn using rational tangle notation.

To enter a knot using the rollers (for those familiar with rational tangle notation):

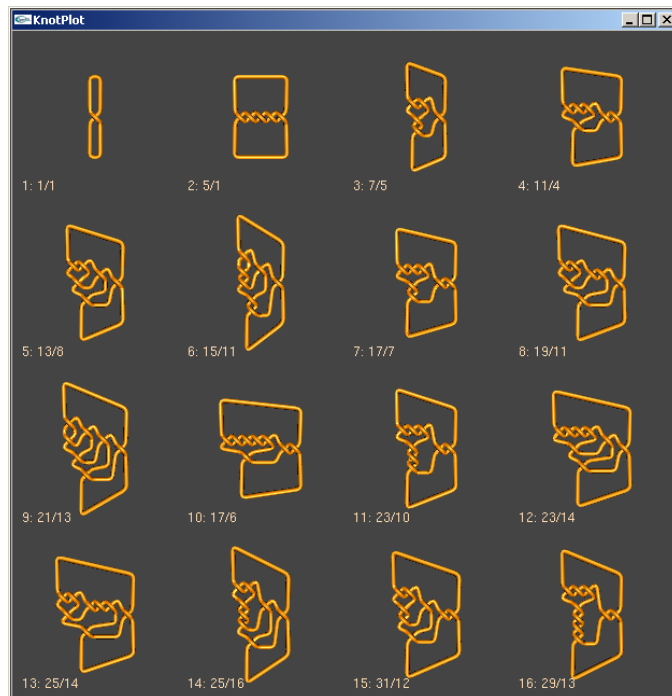
Enter the fraction corresponding to the rational knot $N(A/B)$ by using the top two rollers. You can also enter these numbers by double clicking the number, typing in a new number, and hitting return.

Note you can find this number by looking at the table available at <http://www.math.uiowa.edu/~idarcy/TAB/knottable.ps>.

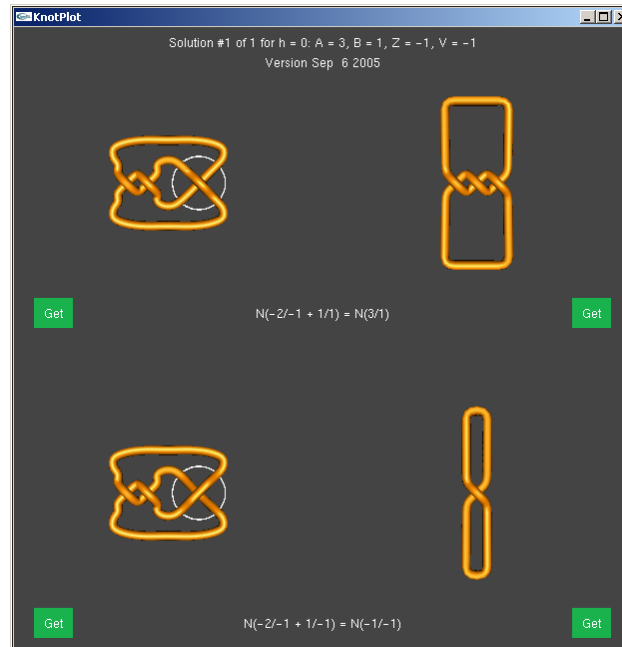
To find knots of crossing distance one from $N(A/B)$, click on the grey box marked "Find Now"



This will find all rational knots up to 13 crossings of crossing distance one from the rational knot $N(A/B)$. They will be displayed in the KnotPlot window by crossing number with the smallest crossing number knots listed first. For example, the following are knots of crossing distance one from the trefoil knot:

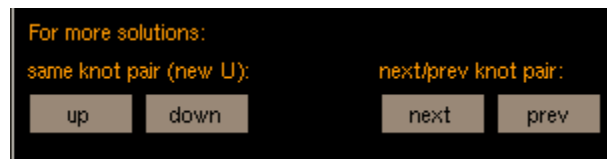


Click on any of the knots to see how the trefoil knot can be converted into this knot via a crossing change. For example, if the unknot is selected, the KnotPlot window will display the following:



The top two figures shows the trefoil knot. The figure on the left shows the crossing that will be changed resulting in the figure below. The bottom two figures show the knot obtained after the crossing change. In this case an unknot results. Clicking on one of the green get button will choose the diagram closest to the get button that you clicked and take you to the TopoICE -Dynamics page where you can run energies.

To see more solutions:



"up" or "down" buttons:

Note there could be more than one way to transform one knot into another knot via a crossing change. Click on the grey box marked "up" or "down" to see the different ways to convert between two given rational knots.

"next" and "prev" buttons:

Click on the grey box marked "next" to see the next knot in the list of rational knots of crossing distance one from the rational knot $N(A/B)$. Click on the grey box marked "prev" to see the previous knot in the list of rational knots of crossing distance one from the rational knot $N(A/B)$.

To determine if it is possible to convert a given knot into another knot via a crossing change:

Enter first knot as described above. Enter second knot using either the load zoo button or the rollers for the second knot:



Click on "Find solutions". If it is possible to change the first knot into the second knot via a crossing change, solutions showing the crossing change will appear in the KnotPlot window as described above. Use the "up"/"down" buttons to scroll through more solutions. Note if you click on "next" or "prev", you will get a new second knot.

If it is not possible to change the first knot into the second knot via a crossing change, "It is not possible to convert N(A/B) into N(Z/V) via a single crossing change." will appear in the KnotPlot Command Window:

