

Homework Guide

Drawing and identifying rational tangles:

1. Rational tangles alternate between vertical crossings & horizontal crossings.

- k horizontal crossings are right-handed if $k > 0$
 k horizontal crossings are left-handed if $k < 0$
- k vertical crossings are left-handed if $k > 0$
 k vertical crossings are right-handed if $k < 0$

Note that if $k > 0$, then the slope of the overcrossing strand is negative, while if $k < 0$, then the slope of the overcrossing strand is positive. By convention, the rational tangle notation always ends with the number of horizontal crossings.

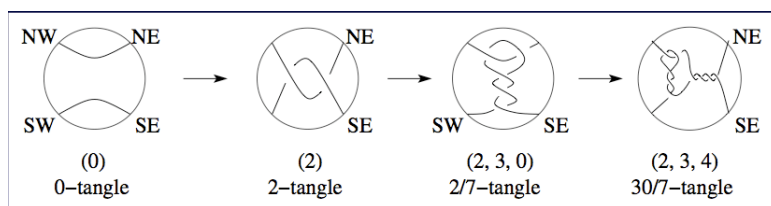


Figure 1: Creation of a rational tangle

2. If tangle T is denoted (a_1, a_2, \dots, a_n) , then its *continued fraction* is calculated:

$$\frac{p}{q} = a_n + \frac{1}{a_{n-1} + \frac{1}{a_{n-2} + \frac{1}{a_{n-3} + \dots + \frac{1}{a_1}}}}$$

Conway proved that there is a 1-1 correspondence between a tangle and its “fraction”, $\frac{p}{q}$.

3. Some sample commands for <http://www.wolframalpha.com/>

- $4 + 1/(3 + 1/2)$
- $3 + 1/(1 + 1/(-4 + 1/(-1 + 1/-1)))$
- continued fraction 30/7

HW part II: Rational knots/links

Suppose $ac > 0$. $N(\frac{a}{b}) = N(\frac{c}{d})$ if and only if $a = c$ and either $b - d$ is a multiple of a or $bd - 1$ is a multiple of a .