Classifying Non-Rational 2-String Tangles

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IOWA

Planar Diagram Notation

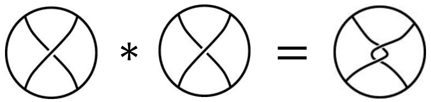
[[8, 2, 7, 1], [3, 9, 2, 8], [11, 6, 12, 7], [5, 10, 6, 11], [9, 4, 10, 5]]

$$[a, b, c, d] = \frac{1}{1}$$

$$\left[\begin{array}{cccc|cc} 8 & 2 & 7 & 1 & 1 & 1 \\ 3 & 9 & 2 & 8 & 1 & 1 \\ 11 & 6 & 12 & 7 & 1 & 1 \\ 5 & 10 & 6 & 11 & 1 & 1 \\ 9 & 4 & 10 & 5 & 1 & 1 \end{array}\right]$$

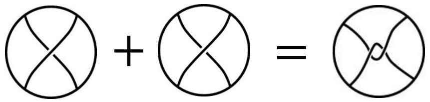
Vertical tangles are denoted by $\frac{1}{n}$.

When they are combined to create a new vertical tangle, the new fraction is $\frac{1}{n+m}$

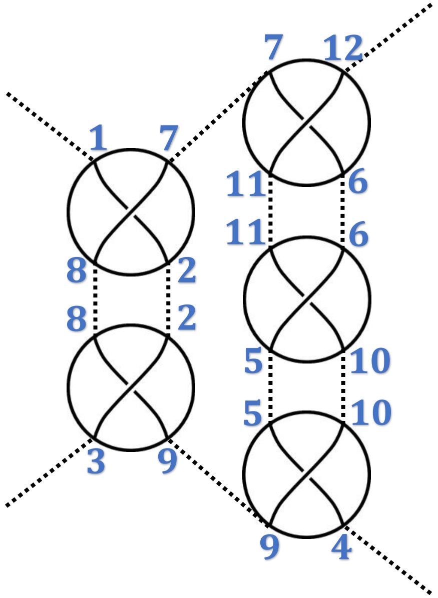


Horizontal (integer) tangles are denoted by $\frac{n}{1}$.

When they are combined to create a new integer tangle, the new fraction is $\frac{n+m}{1}$



$$\left[\begin{array}{cccc|cc} 8 & 2 & 7 & 1 & 1 & 1 \\ 3 & 9 & 2 & 8 & 1 & 1 \\ 11 & 6 & 12 & 7 & 1 & 1 \\ 5 & 10 & 6 & 11 & 1 & 1 \\ 9 & 4 & 10 & 5 & 1 & 1 \end{array}\right] \to \frac{1}{2}, \ \frac{1}{3}$$



$$\left[\begin{array}{cccc|cc} 3 & 9 & 7 & 1 & 1 & 2 \\ 9 & 4 & 12 & 7 & 1 & 3 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{array}\right]$$

Tangle obtained from Planar Diagram Notation

$$\frac{1}{2} + \frac{1}{3}$$

$$\frac{1}{2} = 0 + \frac{1}{2} \qquad \frac{1}{3} = 0 + \frac{1}{3}$$

[2 0] [3 0]

Translated to Conway Notation

[2 0; 3 0] = [2; 3]

Conway Notation (Rational Tangles)

$[a_1 \cdots a_{k-1} a_k]$

Continued Fraction

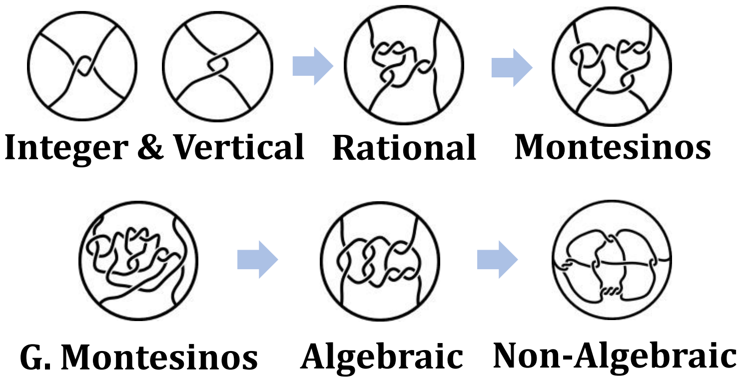
$$\frac{p}{q} = a_k + \cfrac{1}{a_{k-1} + \cdots + \cfrac{1}{a_1}}$$

Alternating right and bottom twists (rational tangle when k is even)

$$\left(\left(\left(\frac{1}{a_1} + \frac{a_2}{1}\right) * \cdots\right) * \frac{1}{a_{k-1}}\right) + \frac{a_k}{1}$$

Additional Symbols (Non- rational)

( ) . ; +, −



To View Tangle Database Visit:

http://www.nick-connolly.com/tangles/tangles.php