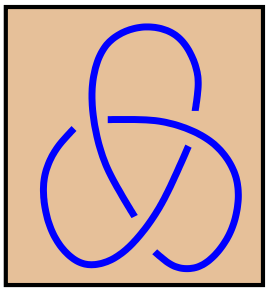
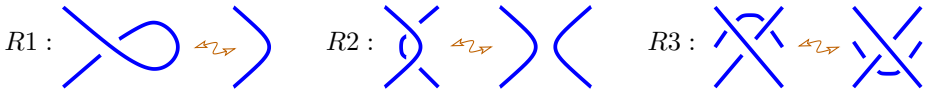
Links [Ad].

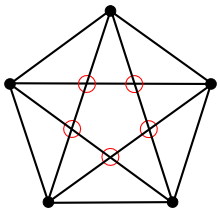


Knot diagram

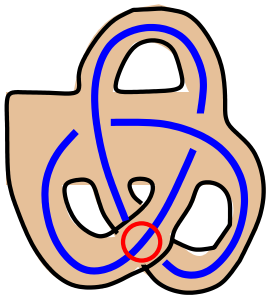
Link diagrams up to planar isotopy and **Reidemeister moves**:



Virtual links [Ka].



Virtual crossing



Virtual knot diagram

Virtual Reidemeister moves:

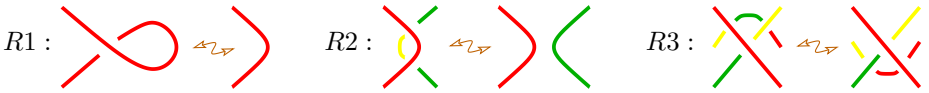
Forbidden moves:

3-colorings of links

Def. A *3-coloring* of a link diagram is a coloring of its arcs into three colors (red, yellow, green) such that at each crossing the three incident arcs are either all of the same color or all of three different colors.

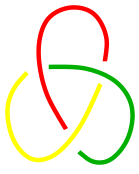
Theorem. *The number of 3-colorings is a link invariant.*

Proof.



□

Example. #3-col(*unknot*)=3, #3-col(3_1)=9.



References

[Ad] C. Adams, *The knot book*, AMS, 2001.

[Ka] L. Kauffman, *Virtual knot theory*, European Journal of Combinatorics, **20** (1999) 663–690.