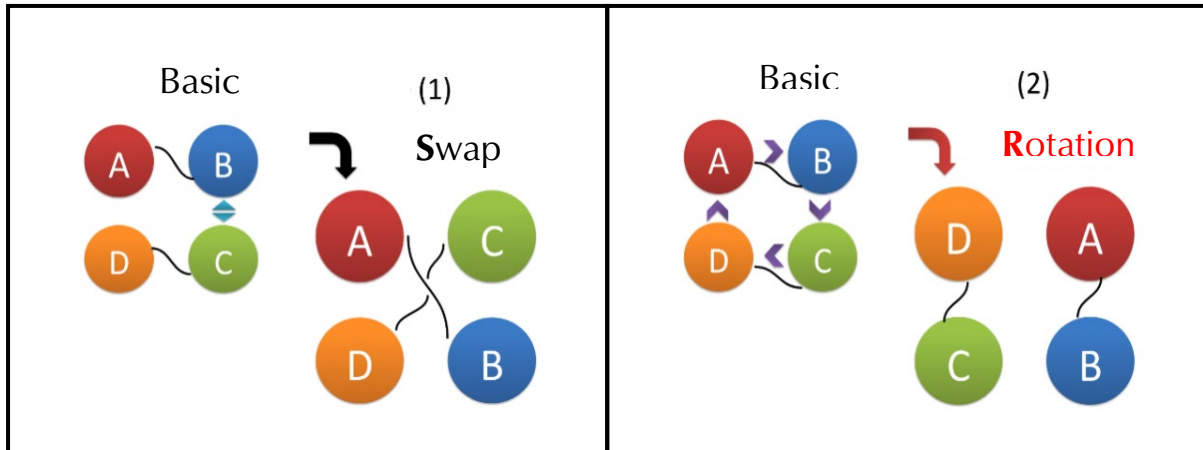


## Dance, tangles, and topology!

# The movement figures



The swap (S) movement corresponds to the operation +1

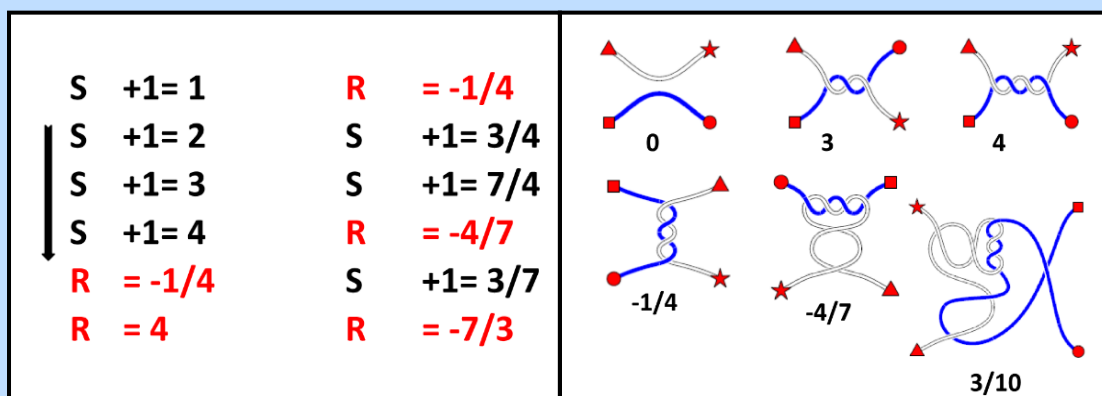
The rotation (R) movement corresponds to taking the negative reciprocal

*Image courtesy of the author*

### The scheme for the mathematical operations

- Ropes untied (initial position) equals 0
- Doing the Swap corresponds to add 1 to the previous number (e.g.  $2 + 1 = 3$ )
- Doing a rotation corresponds to the negative reciprocal, that is inverting and changing the sign of the previous number (e.g., the negative reciprocal of 3 is  $-\frac{1}{3}$ )

The knot obtained thus corresponds to a rational number (in the previous example it corresponds to  $7/3$ ). Now students have to search for a sequence of operations that eventually lead back to zero.



An example of a dance step sequence and the corresponding operations

Some knots and their associated fractions

*Image courtesy of the author*