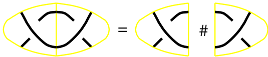
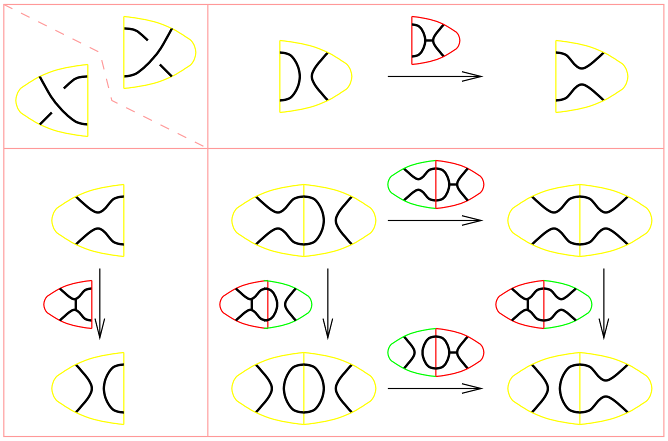
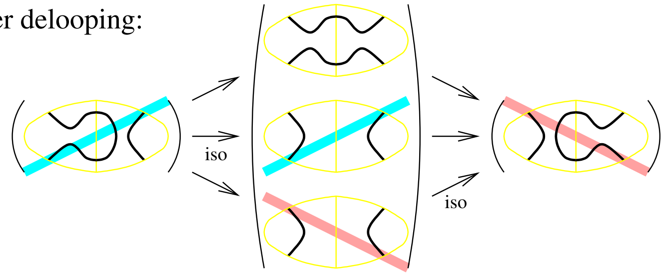
Computations and Mutations



Invariance under R2.



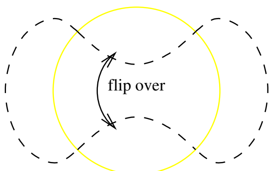
After delooping:



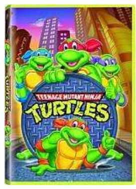
High altitude low oxygen proof of

Invariance under knot mutations.

Assume "flip over" mutation and connectivity as shown.



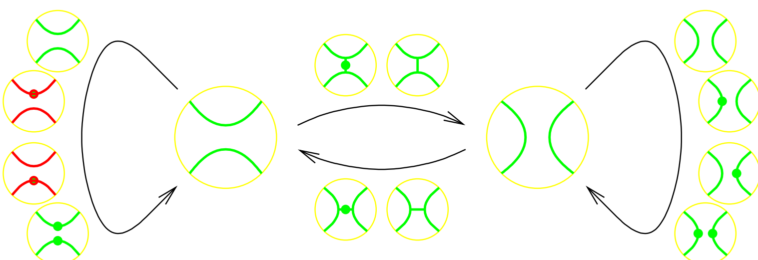
(there are two other cases)



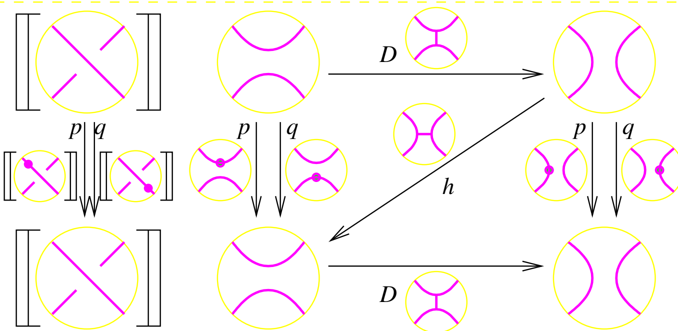
mutants

The Inside Story.

After delooping, all that remains is in



The Outside Story

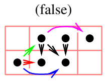


thus dots can be moved at will across outside crossings

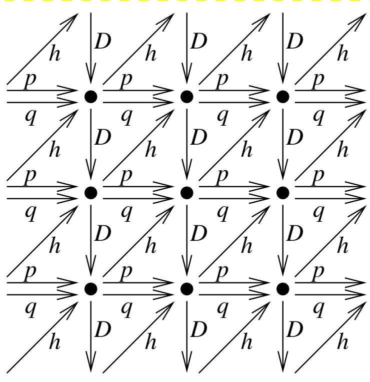
Inside meets Outside.

Theorem. If two horizontal differentials are homotopic relative to the vertical differential, the two double complexes obtained are isomorphic.

(false)



Rasmussen's example

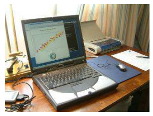


Old techniques:

Many computers, long time, no counterexample.

Snowbird, Utah

Kh(T(7,6)).

In 1 day  says

Old techniques:

~1,000 years,

~1GGb RAM.

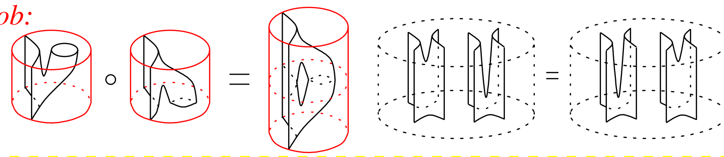
$\dim_j H_r$ is given by:

$j \backslash r$	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
57																	1			1
55																	1	1		
53															1	2		1	1	
51													1	1		2	1			
49														3	1		1			
47												3	1		1					
45										2		1	2							
43								1		1	2									
41						1		1	2		1									
39						1	1		1											
37				1	1		1													
35					1															
33			1																	
31	1																			
29	1																			

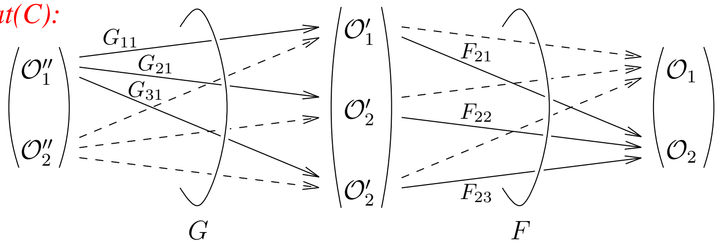
the alternating knots zone

More formulas.

Cob:



Mat(C):



Complexes:

$$\Omega = \left(\Omega^{-n_-} \longrightarrow \Omega^{-n_-+1} \longrightarrow \cdots \qquad \longrightarrow \Omega^{n_+} \right)$$

Morphisms:

$$\begin{array}{ccccccccc}
\cdots & \longrightarrow & \Omega_0^{r-1} & \xrightarrow{d^{r-1}} & \Omega_0^r & \xrightarrow{d^r} & \Omega_0^{r+1} & \longrightarrow & \cdots \\
 & & \downarrow F^{r-1} & & \downarrow F^r & & \downarrow F^{r+1} & & \\
\cdots & \longrightarrow & \Omega_1^{r-1} & \xrightarrow{d^{r-1}} & \Omega_1^r & \xrightarrow{d^r} & \Omega_1^{r+1} & \longrightarrow & \cdots
\end{array}$$

Homotopies:

$$\begin{array}{ccccc}
\Omega_0^{r-1} & \xrightarrow{d^{r-1}} & \Omega_0^r & \xrightarrow{d^r} & \Omega_0^{r+1} \\
F^{r-1} \downdownarrows G^{r-1} & \swarrow h^r & F^r \downdownarrows G^r & \swarrow h^{r+1} & F^{r+1} \downdownarrows G^{r+1} \\
\Omega_1^{r-1} & \xrightarrow{d^{r-1}} & \Omega_1^r & \xrightarrow{d^r} & \Omega_1^{r+1}
\end{array}$$

$$F^r - G^r = h^{r+1} d^r + d^{r-1} h^r$$

All arrows in an arbitrary additive category!

Conjecture:

(I. Frenkel, though he may disown this version)

1. Every object in mathematics is the Euler characteristic of a complex.
2. Every operation in mathematics lifts to an operation between complexes.
3. Every identity in mathematics is true up to homotopy at complex–level.

I. Frenkel