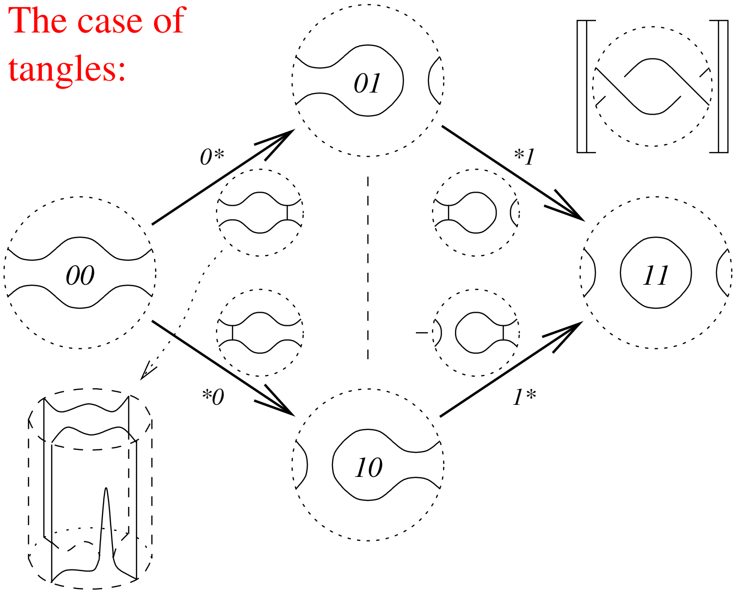
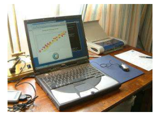
Overview of Khovanov Homology (2)

The case of tangles:



Kh(T(7,6)).

In 1 day  says $\dim_j H_r$ is given by:

Old techniques:

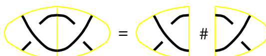
~1,000 years,

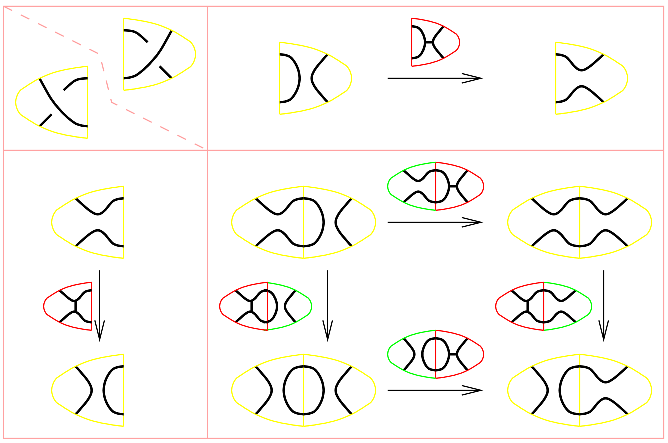
~1GGb RAM.

j \ 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

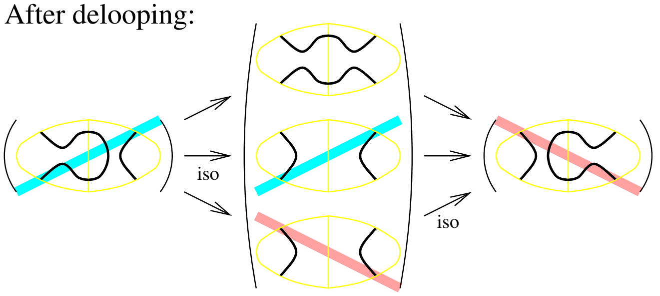
Invariance under R2.



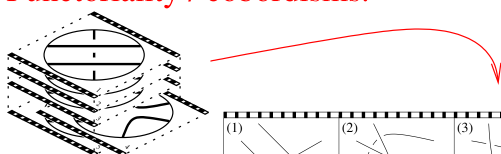


Kurt Reidemeister

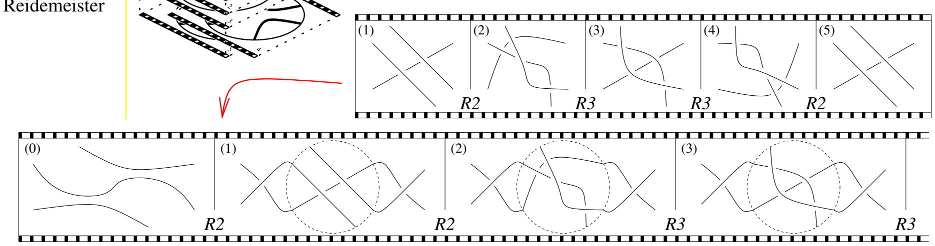
After delooping:

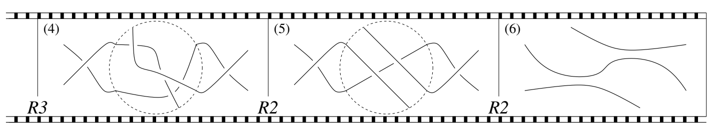


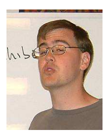
Functoriality / cobordisms.



M. Jacobsson







J. Rasmussen: This leads to a no–analysis proof of Milnor's conjecture

Conjecture:

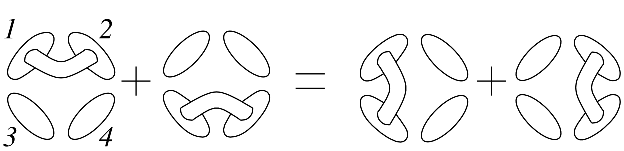
(I. Frenkel, though he may disown this version)

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 remains true up to homotopy.

I. Frenkel

A more general theory:

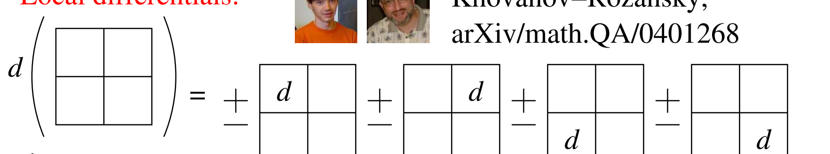
Remove G and NC, add

4Tu: 

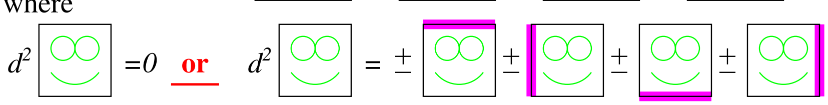
(minor further revisions are necessary)

Local differentials:

Khovanov–Rozansky, arXiv/math.QA/0401268



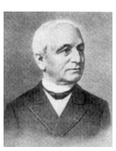
where



"God created the knots,

all else in topology is the work of mortals"

Leopold Kronecker (modified)



Visit!

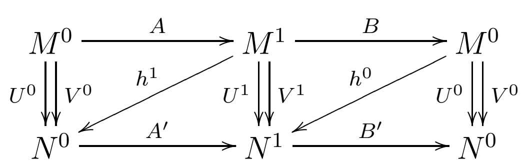
Edit!

http://katlas.math.toronto.edu

Matrix factorizations:

$$D = \begin{pmatrix} 0 & A \\ B & 0 \end{pmatrix}$$

$$AB = BA = \omega I$$



A category, with "complexes", morphisms, homotopies, direct sums and tensor products.

D. Eisenbud

http://www.math.toronto.edu/~drorbn/papers/Cobordism/

http://www.math.toronto.edu/~drorbn/Talks/Istanbul–0606/