

# COLOURED JONES POLYNOMIALS AND TOPOLOGICAL INTERSECTION PAIRINGS

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The world of quantum invariants started with the the discovery of the Jones polynomial. Then, Reshitikhin-Turaev introduced a purely algebraic construction that having as input a quantum group produces link invariants. The coloured Jones polynomials  $\{J_N(L, q)\}_{N \in \mathbb{N}}$  are a sequence of link invariants constructed in this way using the quantum group  $U_q(sl(2))$ , whose first term is the original Jones polynomial.

R. Lawrence introduced a sequence of topological braid group representations based on the homology of coverings of configuration spaces. Using that, Bigelow and Lawrence gave a homological model for the Jones polynomial, using its skein nature.

We will present a topological model for all coloured Jones polynomials. We will show that  $J_N(L, q)$  can be described as graded intersection pairings between two homology classes in a covering of the configuration space in the punctured disc.

This shows that the Lawrence representations are rich objects that contain enough information to encode all coloured Jones polynomials and possibly more. In the last part of the talk we will present some directions towards a geometrical categorification for  $J_N(L, q)$  that can be defined out of this topological model.