Book: Knots and Quantum Groups: Theory and Computations without Representations

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Plotline:

We care about knot invariants! Partially in order to separate knots, and partially for reasons that will be discussed later. We want our invariants to be easily computable (for obvious reasons), and well-behaved (in a sense that will be explained later).

Some QFTs or other machines may compute knot invariants, and depend only on a small neighborhood of a knot diagram. Hence we may care about "Locally Euclidean Knotted Objects" (LEKO), which are nearly the same as rotational virtual knots/tangles.

Operations on LEKO.

"Algebraic knot theory" within LEKO. The image of EKO in LEKO.

Finite-dimensional (Quasi?)-triangular Hopf algebras and LEKO. The group ring example.

The OU story and the Drinfel'd double construction.

U_q(SL_2).

Solvable approximations and the loop expansion.

The circuit algebra of perturbed Gaussians.

Computations and poly-time computations in U_q(SL_2).