

## Topological characterization of Second Cohomology of Knot Quandle

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The knot quandle  $Q(K)$ , introduced by Joyce, is an invariant of a knot  $K$ . There are results concerning with its cohomology  $H^n(Q(K); Z)$ , for example:

The quandle cocycle invariants;

$$H_{quandle}^2(Q(K); Z) \cong Z;$$

The exact seq.  $0 \rightarrow C_n^{degeneracy} \rightarrow C_n^{rack} \rightarrow C_n^{quandle} \rightarrow 0$  splits.

I proved that each cohomology class of  $H_{quandle}^2(Q(K); Z)$  corresponds to the framing of the knot  $K$ .

In this talk, by extending the previous result, we show that each cohomology class of  $H_{rack}^2(Q(K); Z)$  is in 1:1 correspondence with a simple closed curve on the boundary  $\partial N$  of a tubular neighbourhood of the knot  $K$ . Since the second cohomology class of a quandle  $X$  corresponds to a rack extension of  $X$ , we prove the fact by constructing a rack extension for a simple closed curve on  $\partial N$ .

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