Finite type invariants of quandles

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The objects: "based quandles" –

$$(Q, (m_i), (l_i))$$

quandle Q with meridians $(m_i) \subset Q$
and longtitudes $(l_i) \subset Q$

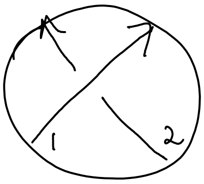
Operations:

S_i: "Reverse the ith strand":
roughly $(m_j, l_j) \longmapsto (m_j^{-1} \uparrow l_j, l_j^{-1})$

Disjoint union: free product of quandles,
concatanation of (meridians) and
(longtitudes).

Also m and Δ operations.

Constants: 1. The free quandle on (m), with $l = 1$.
2. The "crossing" quandle:



$\longmapsto$ $Q = \langle m_1, m_2, l_1, l_2 \rangle /$
$/ \, l_2 = m_1, \; l_1 = 1$

<u>Question</u> Is there a linking number in this generality? Is it of finite type?

<u>Answer</u>: Find the coefficient of m_j in the Abelianization of l_i.

<u>Question</u> Are there type 2 invariants beyond

products of linking numbers?

Question: Can we characterize "virtual knot quandles"?