

# Twisted Alexander invariants of groups

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**Abstract.** The purpose of this talk is to point out that (1) representations into matrix groups are not needed only to define twisted Alexander invariants, and that (2) representing into matrix groups is an effective method to obtain polynomial or function invariants from twisted Alexander matrices.

We notice that (1) and (2) are not contradictory statements.

Let  $G$  be a group, and  $N$  a normal subgroup of  $G$ . To show (1), we define the twisted Alexander module and matrix, which we call twisted Alexander invariants, related with a pair  $(N, G)$  without using representations.

Since to obtain the determinant of a matrix with its entries in a non-commutative group ring is very hard (it cannot be done usually without using K-theory), representing the group into matrix groups is effective to obtain the “determinant”. This implies (2).

We suggest to reexamine the usual definition of twisted Alexander invariants from this point of view.