

# Symmetries of mathematical structures

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”The investigation of symmetries of a given mathematical structure has always yielded the most powerful results” (Emil Artin, *Geometric algebra*, Interscience, New York 1957). The main tool worked out by mathematicians to describe symmetries are the notion of an abstract group and the theory of groups. Automorphism groups of various objects appear in almost every branch of mathematics. Yet, in many fields an abstract group is insufficient to describe the symmetry of an object. A number of examples may be given in the fields of universal algebra, graph theory and combinatorics. A more detailed description of the symmetries is given by means of permutation groups, but the problems become harder. Of course, this is no reason to stop attempts to work out suitable tools for describing symmetries by means permutation groups. I will tell about my attempt in this direction.