

**Abstract**

**Effective algorithmic approaches to the construction  
and classification of finite groups**

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A long-standing challenge problem is that of constructing the groups of a given order. Initiated by Cayley in 1854, it has a chequered history. Related hard problem include the construction of automorphism groups, and isomorphism testing for groups. Over the past three decades, practical algorithms have been developed to answer these questions for certain classes of groups. We identify the nature of the challenge, survey this work, and highlight some open problems.