

The group isomorphism problem in complexity theory

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The group isomorphism problem in computational complexity theory is a decision problem which asks whether two finite groups given by their Cayley tables are isomorphic or not. Although a simple quasipolynomial algorithm for this problem working in time $n^{O(\log n)}$ for groups of order n is known since the 70s, nothing asymptotically better has been achieved since. After L. Babai's 2015 breakthrough quasipolynomial algorithm for the notorious graph isomorphism problem, the group isomorphism problem became the main obstacle towards improving the complexity for graphs.

The talk will discuss the current status of the group isomorphism problem, the primary focus being the classes of finite groups for which there is a polynomial-time isomorphism algorithm. We will also discuss how some problems which are considered to be “wild” in algebra turn out to be “easy” in the computational setting, and how these problems naturally arise in group isomorphism.

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