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First-order sentences in random groups

Abstract: Gromov in his seminal paper introducing hyperbolic groups claimed that a “typical” finitely presented group is hyperbolic. His statement can be made rigorous in various natural ways. The model of randomness that is preferentially focused on is Gromov's density model, as it allows a fair amount of flexibility. In this model a random group is hyperbolic with overwhelming probability.

In a different line of thought, Tarski asked whether all non abelian free groups share the same first-order theory (in the language of groups). This question proved very hard to tackle and only after more than 50 years Sela and Kharlampovich-Myasnikov answered the question positively. Combining the two, J. Knight conjectured that a first-order sentence holds with overwhelming probability in a random group if and only if it is true in a non abelian free group. In joint work with O. Kharlampovich and A. Myasnikov we answer the question positively.