



# GROUPS, LOGIC, AND COMPUTATION. GAGTA-2025

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*On the complexity of the epimorphism problem.*

June 6–13, 2025

*Abstract:*

Consider the following decision problem: given  $G \in \mathcal{D}$  and  $H \in \mathcal{T}$ , decide if there exists a surjective homomorphism from  $G$  onto  $H$ .

We prove that this problem is NP-complete when  $\mathcal{D}$  is the class of all finitely presented groups and  $\mathcal{T}$  is one of the following: the class of direct products  $\mathbb{Z}^d \times Q$  with  $Q$  a finite group, the class of virtually cyclic groups, or a single fixed dihedral group that is not nilpotent.

Our techniques involve reducing epimorphism to decision problems about equations over groups, which I will explain in the talk, along with a survey of previous results.

This is joint work with Jerry Shen (UTS) and Armin Weiß(Stuttgart).