

Best Student Paper Track B: The Identity Problem in $\mathbb{Z} \wr \mathbb{Z}$ is decidable

Wednesday, July 12, 2023 2:25 PM (20 minutes)

Ruiwen Dong

Best Student Paper Track B

Abstract: We consider semigroup algorithmic problems in the wreath product $\mathbb{Z} \wr \mathbb{Z}$.

Our paper focuses on two decision problems introduced by Choffrut and Karhum^aki (2005): the *Identity Problem* (does a semigroup contain the neutral element?) and the *Group Problem* (is a semigroup a group?) for finitely generated sub-semigroups of $\mathbb{Z} \wr \mathbb{Z}$.

We show that both problems are decidable.

Our result complements the undecidability of the *Semigroup Membership Problem* (does a semigroup contain a given element?) in $\mathbb{Z} \wr \mathbb{Z}$ shown by Lohrey, Steinberg and Zetsche (ICALP 2013), and contributes an important step towards solving semigroup algorithmic problems in general metabelian groups.

Presenter: DONG, Ruiwen

Session Classification: ICALP 2023 Award-Winning Papers