

Power Semigroups and Two Rigidity Theorems for Groups

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Abstract. Let $\mathcal{P}(H)$ be the semigroup obtained by endowing the family of all non-empty subsets of a semigroup H with the setwise operation naturally induced by H on its power set, and denote by $\mathcal{P}_{\text{fin}}(H)$ the subsemigroup of $\mathcal{P}(H)$ consisting of all non-empty finite subsets of H .

We prove that if H is a group and K is a semigroup, then $\mathcal{P}(H) \cong \mathcal{P}(K)$ implies $H \cong K$. The finitary analogue of the same statement appears to be considerably more difficult, and we establish it only when H is an additive subgroup of the rationals. The proof of this second result relies, in a circuitous way, on a special case of the Evertse–Schlickewei–Schmidt theorem.

The talk is based on joint work with Shuolin Liu (a 2nd-year undergraduate student at the School of Mathematical Sciences of Hebei Normal University).

About the speaker. Salvatore “Salvo” Tringali is a full professor in the School of Mathematical Sciences at Hebei Normal University (Shijiazhuang, China). His research lies at the intersection of arithmetic combinatorics and semigroup theory, with particular emphasis on power semigroups and non-unique factorization phenomena in algebraic structures such as monoids and rings.

He holds a Ph.D. in mathematics from the University of Lyon, Jean Monnet campus (St-Étienne, France), and a Ph.D. in electronic engineering from Università Mediterranea (Reggio Cal., Italy). Prior to his current appointment, he was a visiting researcher at the Center for Combinatorics, Nankai University (Tianjin, China), a Lise Meitner fellow and lecturer at the University of Graz (Graz, Austria), a postdoc at the Centre de mathématiques Laurent Schwartz, École polytechnique (Palaiseau, France), a research associate at Texas A&M University at Qatar (Doha, Qatar), and a Marie Curie fellow at the Laboratoire Jacques-Louis Lions, Sorbonne University (Paris, France).

In his spare time (that is, when not doing mathematics), he enjoys watching movies about AI and alien life, eating mangoes from Yunnan and Guangxi, and trotting around China.

REFERENCES

- [1] S. Liu and S. Tringali, *Power Semigroups and Two Rigidity Theorems for Groups*, preprint (<https://arxiv.org/abs/2606.01917>).

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