
Mathematical Colloquia

Monday, 31 May 2021

17:15 h, via Zoom

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Representation Theorems for Lattice-Ordered Monoids

Abstract:

Just like the study of the structure of permutations of a set inspired the development of group theory in the second half of the 19th century, a hundred years later the investigation of automorphisms of linearly ordered sets (briefly, chains) led to the study of abstract groups equipped with a compatible lattice order. Nowadays, a substantial structure theory of such *lattice-ordered groups* is available. Despite several decades of research efforts, far less is known about endomorphisms of chains. These are suitably abstracted by monoids with a compatible distributive lattice order, known as *distributive l-monoids*. In this talk, we discuss some recent progress in the field.

It is a known fact that any distributive l-monoid is representable by endomorphisms of a chain; as a consequence, the equational laws of distributive l-monoids coincide with those of endomorphisms of chains. We discuss two significant refinements of this result. First, arbitrary chains can be replaced by *finite chains*; as a corollary, we obtain the decidability of the equational laws of distributive l-monoids. Second, the endomorphisms of arbitrary chains can be replaced by the *automorphisms* of the rational line. If time allows, we discuss some further consequences of these results. This talk is based on joint work with N. Galatos, G. Metcalfe, S. Santschi.

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