

A REPOSITORY FOR LATTICES AND KLEENE ALGEBRAS IN ISABELLE/HOL

ALASDAIR ARMSTRONG
UNIVERSITY OF SHEFFIELD, UK

I present work on a large Isabelle/HOL repository for regular algebras. It contains various lattices, relation algebras and variants of regular and Kleene algebras, including higher-order variants based on quantales. The repository expresses the connections between these algebras, allowing a seamless transition between abstract algebraic structures and concrete models. As part of the repository, many useful Isabelle theories have been developed to assist in working with these algebras, including Backhouse's fixpoint calculus, and the theory of Galois Connections.

This talk discusses the state of the repository, and experiences with using Isabelle. I will also sketch promising future directions for research in this area, in particular, on using the repository to assist in program verification and development tasks.