LOGIC, LATTICES, AND PROFINITE STRUCTURES

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Abstract

In this talk I will explore some fascinating connections between logic, lattices and profinite structures. I will start with a tutorial introduction of the classical theory and then move on to contemporary research.

In the first part, I will introduce the topological duality theory for distributive lattices initially developed by Stone and Priestley, and I will show how this theory applies in particular to the study of type spaces in model theory, and to completeness and interpolation theorems.

In the second part, I will discuss more recent insights in the area, including a logic-based approach to profinite monoids, and I will explain how duality theory has recently developed exciting new connections to the foundations of computer science, specifically for problems coming from automata and programming language theory.

Throughout the talk, I will use concrete examples to illustrate these concepts and make them accessible to a wide audience, including Master's and PhD students who have some background in logic, as well as established logic researchers.

The talk will mostly be based on [2] and [1]

References

[1] Samuel J. van Gool and Benjamin Steinberg, *Pro-aperiodic monoids via saturated models*, Israel Journal of Mathematics **234** (2010), 451–498.

[2] Mai Gehrke and Sam van Gool, *Topological Duality for Distributive Lattices: Theory and Applications*, 2022, arXiv:2203.03286.