

In this thesis, we study relational clones on a two-element domain (hereinafter just “relational clones”). Firstly, we provide an alternative, elementary, and purely relational proof of the famous characterization of all (relational) clones published by E. Post in 1941. Secondly, we study the lattice of multi-sorted (relational) clones, providing an alternative proof of its countability – a result originally due to V. Taimanov from 1983, the proof of which was, however, never published in a journal nor translated from Russian until 2022. We also provide an insight into applying the developed ideas to study the 2-sorted clones.

We approach the problems mainly using the notion of key relations (and the description thereof) introduced by D. Zhuk in 2017, and the well-known Galois connection between operations and relations. Besides providing alternative proofs of these facts, we establish additional tools to simplify the study of relational clones further.