## Modal Model Theory of Lattice Theory: The Case of Modal Validities

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## Abstract

Standard model theory concerns a given first-order theory T and investigates its models in order to better understand its nature. Research in modal model theory has the same goal, but tries to achieve it by studying T with the tools of modal logic. In this talk we will present some results concerning the investigations on the propositional frame  $(Mod(T), \subseteq)$  where T is lattice theory or some stronger theory in the same language, the universe – all its models, and the accessibility relation is the relation of being an extension. These will be compared with other results present in literature. Furthermore, some general results will be presented.

## References

- [1] Adam-Day, S.: Bisimulations of potentialist systems, preprint, arXiv:2206.10359v2 (2022).
- [2] Berger, S., Block, A.C., Löwe, B.: Modal logic of abelian groups, Algebra Universalis 84(25) (2021).
- [3] Hałapacz M.A.: Modal logic of lattices, preprint, DOI: 10.13140/RG.2.2.15397.20964 (2025).
- [4] Hamkins, J.D., Leibman, G., Löwe, B.: Structural connections between a forcing class and its modal logic, Israel Journal of Mathematics, 207(2), 617–651 (2015).
- [5] Hamkins, J.D., Linnebo, Ø.: The modal logic of set-theoretic potentialism and the potentialist maximality principles, Review of Symbolic Logic, vol. 15 1–35 (2022).
- [6] Hamkins, J.D., Löwe, B.: The modal logic of forcing. Trans. Amer. Math. Soc. 360(4), 1793–1817 (2008).
- [7] Hamkins, J.D., Wołoszyn W.A.: Modal model theory, Notre Dame Journal
- [8] Inamdar, T., Löwe, B.: The modal logic of inner models. Journal of Symbolic Logic 81(1), 225–236 (2016).
- [9] Saveliev, D.I., Shapirovsky, I.B.: On modal logics of model-theoretic relations, Studia Logica 108, 989–1017 (2020).