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FAKULTÄT FÜR MATHEMATIK
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Einladung zur öffentlichen Defensio von

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Thema der Dissertation:

Foundations of Higher-Order Forcing

Abstract:

Forcing notions can be classified via their size in a general way. Until now two different types were developed: set forcing and definable class forcing, where the forcing notion is a set or definable class respectively. Here, we want to introduce and study the next two steps in this classification by size, namely class forcing and definable hyperclass forcing (where the conditions of the forcing notion are themselves classes) in the context of (an extension of) Morse-Kelley class theory.

For class forcing, we adapt the existing account of class forcing over a ZFC model to a model $(M, \mathcal{C})$ of Morse-Kelley class theory. We give a rigorous definition of class forcing in such a model and show that the Definability Lemma (and the Truth Lemma) can be proven without restricting the notion of forcing. Furthermore we show under which conditions the axioms are preserved. We conclude by proving that Laver's Theorem does not hold for class forcings.

For definable hyperclass forcing, we use a symmetry between MK** models and models of ZFC$^-$ plus there exists a strongly inaccessible cardinal (called SetMK**). This allows us to define hyperclass forcing in MK** by going to the related SetMK** model and use a definable class forcing there. We arrive at a definable class forcing extension from which we can go back to a model of MK**. To use this construction we define a coding between MK** and SetMK** models and show how definable class forcing can be applied in the context of an ZFC$^-$ model. We conclude by giving an application of this forcing in showing that every β-model of MK** can be extended to a minimal β-model of MK** with the same ordinals.

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