

RESEARCH STATEMENT FOR YOUNG SET THEORY

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My research is generally in the area of forcing and large cardinals. Three specific areas where I have focused my research are generalizations of the Kunen inconsistency, inverse limits of systems of elementary embeddings of models of set theory, and high-jump cardinals.

The Kunen inconsistency states that there is no nontrivial elementary embedding $j : V \rightarrow V$ (given the axiom of choice). In a sense, this is saying that the largest conceivable large cardinal embedding axiom is inconsistent. In [HKP], Joel Hamkins, Greg Kirmayer, and I have constructed examples of additional situations where no elementary embedding exists between two models of set theory, and we have also compiled and organized past theorems of this type.

An inverse limit is the dual notion of a direct limit. I have specified a canonical form for an inverse limit of elementary embeddings of models of set theory, and I have also constructed examples of particular systems for which the inverse limit does and does not exist. Furthermore, I have studied the interaction of inverse limits with forcing and shown that in many cases, forcing preserves inverse limits in a nice way.

A high-jump cardinal is a large cardinal notion stronger than a Vopěnka cardinal and weaker than an almost-huge cardinal. A cardinal κ is high-jump iff there exists a cardinal θ such that κ is the critical point of a θ -supercompactness embedding $j : V \rightarrow M$ with the additional property that for all $f : \kappa \rightarrow \kappa$, the function $j(f)$ does not “jump over” θ at κ , that is to say, $j(f)(\kappa) < \theta$. I am studying the interaction between high-jump cardinals and forcing, as well as investigating related large cardinals given by similar definitions and their comparative places in the large cardinal hierarchy.

REFERENCES

- [HKP] Joel David Hamkins, Greg Kirmayer, and Norman Perlmutter. Generalizations of the Kunen inconsistency. submitted.

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