Inaccessible cardinals without Choice

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Abstract

When working in ZFC, there are several equivalent ways to define a set X being 'smaller than' a set Y. For well-orderable, non-empty sets X and Y, saying $X < Y$ if there is no injection from Y into X is equivalent to arguing that $X < Y$ if there is no surjection from X onto Y, but when working with a model of ZF this isn't true in general. This immediately complicates our definition of what it means for a cardinal to be inaccessible in a model of ZF, as we now don't have a standard definition of a strong limit cardinal.

This talk will explore the relationship between different definitions of inaccessibility as defined in [1], and expand to discuss non-equivalent definitions of weak compactness in ZF.

References

[1] Benedikt Löwe Andreas Blass, Ioanna M. Dimitriou. Inaccessible cardinals without the axiom of choice. *Fundamenta Mathematicae*, 194(2):179–189, 2007.