Abstracts

Some reductions between theorems around ATR

Jun Le Goh

Cornell University, USA

ABSTRACT

We study theorems with reverse mathematical strength around ATR from the point of view of computability-theoretic reducibilities. Consider the ATR-like problem of producing the jump hierarchy on a given well-ordering. Consider also its "two-sided" version: given a linear ordering L, produce either a jump hierarchy on L or an infinite L-descending sequence. We present reductions between these problems and weak comparability of well-orderings, the restriction of Fra?ssé's conjecture to well-orderings, and König's duality theorem. In particular, we answer a question of Marcone by showing that comparability of well-orderings is Weihrauch equivalent to its weak version.

Two Consequences of the Hugeness

Jinglun Cai

University of Barcelona, Spain

ABSTRACT

We show that a huge cardinal produces an instance of second order Löwenheim-Skolem statement, and the hugeness also implies certain positive instance of square brackets partition.

Factorials of Infinite Cardinals in ZF

Guozhen Shen

Chinese Academy of Sciences, China

ABSTRACT

In 1976, Dawson and Howard defined $\mathfrak{a}!$, the factorial of infinite cardinal $\mathfrak{a}$, as the cardinality of the set of all permutations on a set of cardinality $\mathfrak{a}$. They proved that, without AC, we cannot make any conclusion about the relationship between $\mathfrak{a}!$ and $2^{\mathfrak{a}}$. They also proved in ZF the analog of Cantor's theorem with $2^{\mathfrak{a}}$ repalced by $\mathfrak{a}!$. In this talk, we prove the following results about $\mathfrak{a}!$: ZF proves that for all cardinals $\mathfrak{a}$, $[\mathfrak{a}]^2 < \mathfrak{a}!$; it is consistent with ZF that there exists an infinite cardinal $\mathfrak{a}$ such that $\mathfrak{a}! < [\mathfrak{a}]^3$.

Factorials of Infinite Cardinals and Finite-to-one Maps

Jiachen Yuan

Chinese Academy of Sciences, China

ABSTRACT

In this talk, we try to show that it is consistent with ZF that there exists an infinite set x such that there is a finite-to-one map from the set of all permutations on x into x itself, and thus answer a question of G. Shen.

Non-measurability of the algebraic sums of sets of real numbers

Ziemowit Kostana

University of Warsaw and Czech Academy of Sciences, Poland

ABSTRACT

Consider the following problems:

1. If A is a meagre (null) subset of the real line, does there necessarily exist a set B such that the algebraic sum A+B doesn't have the Baire property (is non-measurable)?

2. If A is a meagre (null) subset of the real line, does there necessarily exist a non-meagre (non-null) additive subgroup, disjoint with some translation of A? It is not hard to prove, both in the case of measure and category, that the affirmative answer to 2. implies the affirmative answer to 1.

   We answer 2. affirmatively for category, while version for measure turns out to be independent of ZFC. The latter fact was essentially proved last year by A. Roslanowski and S. Shelah. Both results holds for Cantor space with coordinate-wise addition mod. 2 as well.

Interpolative fusions

Minh Chieu Tran

University of Illinois at Urbana Champaign, USA

ABSTRACT

We study the model theory of interpolative fusions, that is, structures built up from simpler ones in a fashion that maximizes intersections of definable sets of the components (often reflecting randomness or genericity). The notion surprisingly generalizes many prominent examples in model theory, so we recover known results about these as special cases of our theory. Along the way, we obtain sufficient conditions for the union of two theories to have a model companion. (Joint work with Alex Kruckman and Erik Walsberg).