KURT GÖDEL RESEARCH CENTER FOR MATHEMATICAL LOGIC

UNIVERSITÄT WIEN

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INVITATION

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A FORCING BUILT AROUND A COHERENT SOUSLIN TREE AND ITS USES FOR NORMAL, LOCALLY COMPACT SPACES

Abstract:

A form of forcing involving ground models with coherent Souslin trees was invented by Paul Larsen and Stevo Todorcevic in order to lay to rest a 1948 problem of Katetov, who had shown that a compact space X is metrizable iff either X^2 is perfectly normal or X^3 is hereditarily normal (abbreviated T_5: this means every subspace is normal).

In 1977 I found a nice example if there is a Q-set, of a space X where X^2 is T_5 but X is not metrizable, and later Gary Gruenhage found a completely different example under CH. Larson and Todorcevic found a model in 2002 where there are no such examples.

Their technique consisted of forcing from a ground model with a coherent Souslin tree S to get all ccc posets P that presere S to have filters meeting any collection of $< \mathfrak{c}$ dense subsets of P [Such models are referred to by the shorthand MA(S).] and then forcing with S itself, resulting in MA(S)[S] models.

These models have "paradoxical" properties, satisfying some consequences of V=L such as "every first countable normal space is collectionwise Hausdorff" and some consequences of MA(ω_1) such as "every separable locally compact normal space is hereditarily separable and hereditarily Lindelöf."

Since then, the technique has been expanded to replace "ccc" with "proper" to give PFA(S)[S] models and very recently to replace it with "semi-proper" to give MM(S)[S] models. Locally compact spaces of various sorts have been shown to have a host of simplifying properties in these models. One striking recent example:

Theorem. In MM(S)[S] models, every locally compact, T_5 space is either hereditarily paracompact or contains a copy of the ordinal space ω_1.

Many other examples will be surveyed and shown not to follow just from ZFC. For instance, a Souslin tree with the order topology is a (consistent!) counterexample to the topological statement in the preceding theorem.

TUESDAY, JUNE 28, 2016

Talk at 2:00pm in the KGRC lecture room (room 101)

Tea at 3:30pm in the KGRC meeting room (room 104)

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