ON A CLASS OF POLISH-LIKE SPACES

CLAUDIO AGOSTINI AND LUCA MOTTO ROS

The Cantor and Baire spaces have natural generalizations to uncountable cardinals κ, and in the last two decades many results have been proven about them under the hypothesis $\kappa^{<\kappa} = \kappa$. There is more uncertainty about what should be the right generalization of Polish spaces. What we expect is a class of spaces of weight κ which includes the two previous mentioned and can support most of generalized descriptive set theory. Recently S. Coskey and P. Schilcht in [1] showed that one property that characterize the completeness of metric spaces in the classical case, being strong Choquet, can be extended to higher cardinals and gives a class of spaces with promising properties.

The assumption $\kappa^{<\kappa} = \kappa$ is equivalent to $2^{<\kappa} = \kappa$ for κ regular, but the second one is suitable also for singular cardinals. In a forthcoming paper, V. Dimonte, L. Motto Ros and X. Shi use this last assumption to study descriptive set theory on singular cardinals of countable cofinality, where there is a natural definition of λ-Polish as a completely metrizable space of weight λ.

In this talk, I will present an ongoing work in collaboration with L. Motto Ros where we try to put together this two approaches and study a class of spaces which is suitable for all cardinals satisfying $2^{<\lambda} = \lambda$, but coincide with S. Coskey and P. Schlicht's definition if λ is regular, and with V. Dimonte, L. Motto Ros and X. Shi's one if λ has countable cofinality. I will define this class and show how many properties that holds in the classical theory may be proved with different or similar tools in this case as well.

References

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(Claudio Agostini) Università degli Studi di Torino, Dipartimento di Matematica "G. Peano", Via Carlo Alberto 10, 10123 Torino, Italy.
Email address, Claudio Agostini: claudio.agostini@unito.it

(Luca Motto Ros) Università degli Studi di Torino, Dipartimento di Matematica "G. Peano", Via Carlo Alberto 10, 10123 Torino, Italy.
Email address, Luca Motto Ros: luca.mottoros@unito.it

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