TOPOLOGY SEMINAR

Fusion systems, linking systems and punctured groups

By

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Abstract: Saturated fusion systems and associated linking systems are categories modelling the p-local structure of finite groups. In particular, linking systems contain the algebraic information that is needed to study p-completed classifying spaces of fusion systems similarly to p-completed classifying spaces of finite groups. If G is a finite group and S is a Sylow p-subgroup of G, then we can construct a saturated fusion system $\F_S(G)$ as follows: The objects are all subgroups of S, and the morphisms between two objects are the injective group homomorphisms induced by conjugation with elements of G. Saturated fusion systems which do not arise in this way are called exotic.
The concept of a linking system was generalized by Oliver and Ventura to transporter systems. Andrew Chermak introduced moreover group-like structures, called localities, which correspond in a certain way to transporter systems. I will give an introduction to the subject and outline how the theory of localities can be used to prove new theorems on fusion systems. Moreover, I will report on a project with Assaf Libman and Justin Lynd, where we study "punctured groups". Here a transporter system (or a locality) associated to fusion system $\F$ over S is called a punctured group if the object set is the collection of all non-identity subgroups. It should be noted in this context that a fusion system $\F$ over a p-group S can be realized as a category $\F_S(G)$ as above if and only if there is a transporter system whose object set is the full collection of subgroups of S. In particular, to every group fusion system one can associate a punctured group. In the project with Libman and Lynd, we determine for many of the known exotic fusion systems whether an associated punctured group exists.

Date: April 25, 2022
Time: 15:00
Place: Zoom

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