COMPUTING GROUP-THEORETICAL CATEGORIES AND THEIR INVARIANTS

PETER SCHAUENBURG

Abstract: A group-theoretical fusion category is a fusion category (i.e. a finitely semisimple tensor category with simple unit object) categorically Morita equivalent to a pointed one (i.e. one where every simple object is invertible. Thus, group-theoretical fusion categories can be obtained in a particularly explicit way from data involving finite groups: A pointed category amounts to a group and a three-cocycle, and the step to a categorically Morita equivalent category is done by picking a subgroup subject to a cohomological condition. A particularly prominent example of a *modular* group-theoretical fusion category is the module category of a twisted Drinfeld double. In the framework of classification results on (modular) fusion categories, the group-theoretical case is sometimes dismissed as the trivial part (a little like group algebras among Hopf algebras), but there is a quite large supply of inequivalent such objects, and their structure and classification is not so obvious.
In this talk we will report on some efforts (joint with Michaël Mignard) to treat group-theoretical categories with computer help. In particular, we will discuss how to produce such categories, how to establish the (non-)existence of (Morita) equivalences between them, and how to calculate invariants, in particular Frobenius-Schur indicators; the latter will be used both for distinguishing categories and (maybe more surprisingly) for showing their equivalence.