DUALIZABILITY AND ORIENTABILITY FOR TENSOR AND BRAIDED TENSOR CATEGORIES

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Morita theory – the study of algebras, bimodules, and bimodule homomorphisms – naturally organizes the collection of algebras over a field into a 2-category. This 2-category underpins the so-called Dijkgraaf-Witten topological field theories (TFTs), and this observation allows us to understand many basic structures in classical representation theory, e.g. the notion of a Frobenius algebra, a semi-simple algebra, a separable algebra, all in topological terms.

In a similar way, Morita theory organizes the collection of tensor categories into a 3-category, and braided tensor categories into a 4-category. In the finite-dimensional setting of fusion categories Douglas, Schommer-Pries and Snyder have shown that the 3-category of fusion categories underpins (and generalizes) Turaev-Viro-style TFTs. In this talk, I'll explain this paradigm in several related settings: for tensor categories of infinite/non-semi-simple type, and for braided tensor categories, in both the finite/fusion and infinite/non-semi-simple settings: in the finite case, the resulting Morita theory underpin so-called Crane-Yetter-Kauffman TFTs, and hence indirectly the Witten-Reshetikhin-Turaev TFTs, while in the infinite setting, we produce in this way new TFTs which are related to quantizations of character varieties. This is based on joint works with David Ben-Zvi, Adrien Brochier, and Noah Snyder.