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Bundle gerbes and surface holonomy

Abstract: As is by now well-established, Hermitian bundle gerbes are the appropriate geometric framework for Wess-Zumino terms entering the Lagrangian description of certain two-dimensional quantum field theories. We introduce algebraic notions for Hermitian bundle gerbes, including Jandl structures, gerbe modules and gerbe bimodules. We show how they arise in the description of such theories on unoriented surfaces, surfaces with boundaries and surfaces with defect lines, respectively. The results closely parallel, and are inspired by, an algebraic approach to conformal field theories based on Frobenius algebras in modular tensor categories.