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Vertex Operator Algebras and 3-dimensional Topological Quantum Field Theories

The 3-dimensional topological quantum field theory (3d-TQFT) belonging to a vertex operator algebra (VOA) can be considered as a generalisation of the classical notion of the genus of a quadratic form. We will discuss different aspects of this generalisation, some of them are indicated in the following table of analogies:

general analogies

quadratic form	VOA
genus	3d-TQFT & rank
class number	class number
theta series	correlation functions
codes over abelian groups	codes over 3d-TQFTs

analogies between special objects

(shorter) Leech lattice	(shorter) moonshine module
Conway groups	(Baby) Monster
Niemeier classification	list of Schellekens
lattices with long shadows	SVOAs with long shadows