

Proposition de cours avancé M2 Math IR 2022-2023

Abelian Topological Quantum Field Theory in dim 3 and the Weil representation

We will study the relationship between Abelian Topological Quantum Field Theories and the Weil representation. We will study the algebraic link between the two with special emphasis on the geometry (skein theory).

1. Basics on two and three-manifolds ; Intersection and linking pairings.
2. Foundations of Topological Quantum Field Theories
3. Projective representations. The Schrödinger representation and the Weil representation.
4. Skein theory.

Prerequisites : introduction to differential and algebraic topology (Thomas Fiedler).

References :

- R. Gelca, Theta functions and knots. World Scientific Publishing Co. 2014.*
V.G. Turaev, Quantum invariants of knots and three-manifolds, W. de Gruyter, New York (1994).
A. Juhasz, Defining and classifying TQFTs via surgery, 2017.