Séminaire d'algèbre, topologie et géométrie
Jeudi 29 mars à 14h
Salle I

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Quantum invariants of singularities : cohomological field theories from matrix factorizations

A Cohomological quantum field theory (CohFT) is an algebraic structure underlying the properties of the Gromov-Witten invariants and quantum cohomology of projective varieties. I will present a CohFT associated to a quasihomogeneous isolated singularity W with a group G of its symmetries. The state space of this theory is the equivariant Milnor ring of W and the corresponding invariants can be viewed as analogs of the Gromov-Witten invariants for the non-commutative space associated with the pair (W,G). In the case of simple singularities of type A, these invariants control the intersection numbers on the moduli space of higher spin curves and lead to the proof of Witten's conjecture relating these numbers with the Gelfand-Dickey hierarchy of integrable PDEs. In general, they are essential ingredients in various mirror-symmetry statements. The construction of the CohFT is based on categories of (equivariant) matrix factorizations of singularities with the role of the virtual fundamental class from the Gromov-Witten theory played by a "fundamental matrix factorization" over a certain moduli space.