Developments of Geometry by topological Field theory

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【Outline of survey】

1. To establish the following general frame work : Construct moduli space using nonlinear PDE, Study it using homological algebra, obtain algebraic structure.
2. Use the general transversality frame work (Kuranishi structure) for this purpose.
3. To unify various studies of moduli spaces : one is based on functional analysis the other on algebraic method.
4. To apply operad or several machinery of algebraic topology for this purpose.
5. To prove homological Mirror symmetry
6. Use algebraic structure on loop space homology to study pseudoholomorpic curve with boundary
7. Apply them to symplectic topology etc

【Expected results】

One can establish various basic methods to study moduli space by PDE.

We expect to have various applications to symplectic geometry.

One can find better understanding of Mirror symmetry.

One can get better understanding on mathematical basis of quantum field theory.

It will provide a step towards mathematical formulation of string theory.

One may obtain applications to low dimensional topology.

【References by the principal researcher】

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【Homepage address】 http://www.math.kyoto-u.ac.jp/%7Efukaya/fukaya.html