Introduction to Frobenius manifolds

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SISSA, starting from Jan. 12, 2016, Tuesday and Thursday: 9:00am-11:00am

The goal of this mini-course (1 cycle, ≈ 15 hours) is to give an introduction to the theory of Frobenius manifolds and Gromov–Witten invariants.

Outline

1. Frobenius manifolds. Examples:

    a. Quantum cohomology of a projective variety;
    b. The orbit space of a Coxeter group;
    c. Miniversal deformation of a singularity.

2. Dubrovin connection and monodromy data of a Frobenius manifold.

3. Periods, Dubrovin's superpotentials and spectral curves.

4. Principal hierarchy of a Frobenius manifold and the genus zero free energy.

5. Reconstruction of higher genus free energies of a *semisimple* Frobenius manifold:

    a. Dubrovin–Zhang's integrable hierarchy;
    b. Givental quantization.

6. Cohomological field theory — will be studied in subsequent learning seminars.

Pre-requisite   Differential Geometry.

Grades   [Homework (60%)] + [either exam (40%) or presentation (40%)].

References

1. Dubrovin, B. Geometry of 2D topological field theories.

2. Dubrovin, B. Painlevé transcendents in two-dimensional topological field theory.

3. Dubrovin, B., Zhang, Y. Normal forms of hierarchies of integrable PDEs, Frobenius manifolds and Gromov-Witten invariants.