Moduli space of general connections

Stanislav Dubrovskiy

A problem of finding functional moduli or establishing their finiteness in various local differential-geometric settings was recently discussed by Arnold [A].

In this talk we investigate the moduli space of general connections (with torsion). We consider the action of the group of origin-preserving diffeomorphisms on the space of germs of generic connections at a point. The resulting moduli space gives rise to a *Poincare series*. By analyzing the corresponding moduli spaces of k-jets we conjecture that the series can be rewritten as a rational function, thus indicating a finite number of functional invariants.

This would confirm the finiteness conjecture of Tresse [T], that algebras of invariants of "natural" differential-geometric structures are finitely generated. This is a joint work in progress with Mikhail Shubin.

References

[A] Arnold, V.I., Mathematical Problems in Classical Physics in: *Trends and Perspectives in Applied Mathematics, Applied Mathematics Series* vol.100, Editors: F.John, J.E.Marsden, L.Sirovich; N.Y. Springer 1999, pp.1-20.

[T] Tresse, A., Sur les Invariants Differentiels des Groupes Continus des Transformations, *Acta Mathematica*, 1894, vol.18, pp.1-88.