Holomorphic Cartan geometries on simply connected manifolds

Sorin Dumitrescu [1], Indranil Biswas[2], Benjamin McKay[3]

[1] Université Côte d'Azur, Nice

[2] T.I.F.R, Mumbai

[3] Univ. College Cork

This talk deals with holomorphic Cartan geometries on compact complex manifols. The concept of holomorphic Cartan geometry encapsulates many interesting geometric structures including holomorphic Riemannian metrics, holomorphic affine connections or holomorphic projective connections. Conjecturaly, a compact complex simply connected manifold bearing a holomorphic Cartan geometry with model the complex homogeneous space G/H, must be biholomorphic to G/H. We present here some recent results going toward this direction. In particular, we show that compact complex simply connected manifolds do not admit holomorphic Riemannian metrics. We also show that compact complex simply connectd manifolds in Fujiki class $\mathcal{C}$ bearing holomorphic Cartan geometries of algebraic type are projective. Those results were obtain in a joint work with Indranil Biswas.

We also show that compact complex simply connected manifolds of algebraic dimension zero do not admit holomorphic Cartan geometries (this is a joint work with I. Biswas and B. McKay).

References

[1] I. Biswas and S. Dumitrescu, *Holomorphic Riemannian metric and fundamental group* , Bull. S.M.F.

I. Biswas and S. Dumitrescu, *Fujiki class C and holomorphic geometric structures*, https://arxiv.org/pdf/1805.11951.pdf

I. Biswas, S. Dumitrescu and B. McKay, *Cartan geometries of complex manifolds with algebraic dimension zero*, https://arxiv.org/abs/1804.08949.