

Symmetry analysis of non-integrable almost complex structures

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Date / Time / Location: Tue. February 7, 2012, 10:00 - 11:00, JD35.

Abstract:

Contrary to complex structures, a generic almost complex structure has no local symmetries. In this talk I will discuss two problems. At first, I would like to give a criterion of finite-dimensionality/finiteness for the pseudogroup of symmetries. Namely I'll prove this provided the almost complex structure is non-degenerate. There are however topological obstructions for existence of non-degenerate structures on closed manifolds. I will also give a bound for the dimension of the symmetry pseudogroup in the non-degenerate case. Secondly, I would like to describe the sub-maximal symmetric structures, i.e. almost complex structures with non-zero Nijenhuis tensor and the symmetry pseudogroup of maximal size. In general such geometric structures are of significant interest, and in almost complex category I will show that they have a signature of integrability: they possess pseudo-holomorphic foliations that are usually non-existent. If time permits I will explain how the compact exceptional Lie group G_2 and the Calabi almost complex structure on S^6 can be uniquely characterized via the symmetry approach.