Lie algebroids

Marius Crainic

Abstract

Lie algebroids are everywhere in differential geometry. Basic examples come from Lie algebras, bundles of such, manifolds, infinitesimal actions on manifolds, regular foliations, Mollino's theory of Riemannian foliations, Poisson manifolds, Jacobi manifolds, linearizability of Poisson structures, geometry of manifolds with corners, index theory. The integrability of such structures ("Lie third for Lie algebroids") appears as one of the most general integrability problems in differential geometry, and includes several well known results (Lie third for Lie algebras, Frobenius theorem, Palais' work on the integrability of infinitesimal actions, and other results of F. Alcade Cuesta and G. Hector, C. Debord, A. Douady and M. Lazard, K. Mackenzie, I. Moerdijk- J. Mrcun, P. Mollino, V. Nistor, A. Weinstein and others). It is also part of a bridge which allows to approach classical singular structures using noncommutative geometry methods.

In this talk I will give some highlights of the theory of Lie algebroids, based on examples. If the time allows, I will also explain the recent integrability criteria found in a joint work with R. L. Fernandes.