Integrating Nijenhuis Structures

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Abstract:

A Nijenhuis operator on a manifold is a (1,1) tensor fulfilling an appropriate integrability condition. Nijenhuis operators appear naturally in complex geometry, integrable systems, projective geometry, etc. Recently, they draw the attention of researchers in their own. A Nijenhuis operator N defines a Lie algebroid which knows everything about N. We say that a Lie groupoid G integrates N if G integrates the Lie algebroid of N. In this case, G can be seen as a global counterpart of N, similarly as symplectic groupoids are global counterparts of Poisson structures. In this talk we characterize Lie groupoids integrating a Nijenhuis operator. Our criterion involves a cochain complex whose O-cocycles are multiplicative (1,1) tensors. Time permitting, we will illustrate our main result with various simple examples including: integrable almost tangent structures, integrable projections, pre-Lie algebras (joint work with F. Pugliese and G. Sparano).