ON THE HIGH ORDER GEOMETRY ON OSCULATOR SPACES AND ANCHORED VECTOR BUNDLES

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Higher order geometry was studied by M. de Leon and R. Miron using the bundles of accelerations. R. Miron studies Finsler and Lagrange spaces of higher order, constructing a dual theory of higher order Hamilton spaces by means of some Legendre transformations that relates a lagrangian and a hamiltonian of the same order. These Legendre transformations use essentially an affine section and they are not intrinsic associated with the lagrangian or the hamiltonian. In order to remove this inconvenient, we define an affine hamiltonian, which can be related by Legendre transformations with a lagrangian of the same order. These Legendre transformations are intrinsic associated with the lagrangian or the affine hamiltonian and give a bijective correspondence between the regular lagrangians and affine hamiltonians of the same order.

A theory of Hamilton submanifolds was considered by R. Miron also in the case of higher order geometry. He defines an induced hamiltonian on the submanifold, which is not intrinsic (the induction procedure is not uniquely defined by the hamiltonian and the submanifold). We study here some intrinsic ways to induce a hamiltonian and an affine hamiltonian of higher order on a submanifold.

All the constructions considered above are also possible for anchored vector bundles. One obtain a general theory of higher order geometry of anchored vector bundles, using almost Lie structures, a generalization of Lie algebroids.