

# INTEGRABILITY THEOREMS OF FREE SYSTEMS AND SYMPLECTIC HAANTJES STRUCTURES

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Ikeda and Sakamoto studied a dynamical control problem called the linear first integral for holonomic dynamical systems, and our proposition proved the same result as theirs in integrability. Also, a symplectic Haantjes manifolds has been defined by Tempesta and Tondo, which is a characterization of integrable systems using  $(1, 1)$  tensor fields. We show integrability in dynamical control problems from a geometric point of view by means of a concrete construction of a symplectic Haantjes manifold.

MSC: 37J35, 53C43, 70H03, 70H06

Keywords: Affine Killing vector field, extended harmonic map, Haantjes operator, Hamiltonian of free system, symplectic-Haantjes manifold

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