

# Geometry “à la Cartan” and its applications to Hamiltonian mechanics

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Many problems of Hamiltonian mechanics can be incorporated into the framework of Cartan geometry. As is well-known, Killing tensors appear naturally in the study of Hamiltonian systems that admit first integrals of motion that are polynomial in the momenta. In turn, the study of algebraic invariants, covariants and joint invariants of Killing tensors is based on the techniques from Cartan geometry (e.g., the method of moving frames), and as such can be looked upon as a natural extension of the classical invariant theory of homogeneous polynomials. As an illustration, I will show how the classical Bertrand-Darboux problem of Hamiltonian mechanics and its generalizations can be solved with the aid of invariants of Killing tensors.

## References

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