

Time-dependent Hamiltonian systems

The cotangent bundle is a good model for the study of autonomous Hamiltonian systems. But for time-dependent Hamiltonian systems there is a variety of possible differential geometric models. We introduce the dual bundle of the first jet bundle of a bundle E over \mathbb{R} , denoted as $J^1\tau^*$, which is a convenient setting for the analysis of intrinsic aspects of time-dependent Hamiltonian systems. We discuss the construction of a Poisson-Nijenhuis structure on $J^1\tau^*$ making use of the complete lift of a (1,1) tensor field on E to $J^1\tau^*$.