

## Hamilton-Jacobi Treatment of Damped Motion

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**Abstract :** In this work, we apply the method of Hamilton-Jacobi to obtain solutions of Hamiltonian systems in classical mechanics with two certain structures: the first structure plays a central role in the theory of time-dependent Hamiltonians, whilst the second is used to treat classical Hamiltonians, including dissipation terms. It is proved that the generalization of problems from the calculus of variation methods in the nonstationary case can be obtained naturally in Hamilton-Jacobi formalism. Then, another expression of geometry of the Hamilton Jacobi equation is retrieved for Hamiltonians with time-dependent and frictional terms. Both approaches shall be applied to many physical examples.

**Keywords :** Hamilton-Jacobi, time dependent lagrangians, dissipative systems, variational principle

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