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Abstract

Recent developments in the geometric theory of variational differential equations will be presented. The following topics will be discussed:

1. Differential equations in jet bundles
2. Variational equations, necessary and sufficient conditions of variationality.
3. Variational ordinary differential equations: classification, structure of solutions, regular and singular variational problems.
4. Variational partial differential equations: regularity, Hamiltonian differential systems.
5. Methods of solutions of variational equations: symmetries and conservation laws, the Liouville and Hamilton-Jacobi method.