

Global variational principles: Foundations and current problems

Demeter Krupka

Abstract

1. Variational functionals on fibered spaces
2. First variation and the Lepage forms, the Euler-Lagrange form
3. Higher variations
4. Invariant variational functionals, first theorem of E. Noether
5. Natural variational principles, second theorem of E. Noether
6. Variationally trivial Lagrangians
7. The inverse problem of the calculus of variations
8. The variational sequence
9. Lepage forms: Examples, generalizations
10. Invariant variational principles on principal fiber bundles
11. Energy-momentum tensors
12. Jets and contact elements