

Variational Foundations of General Relativity Theory

Contents

- 1. Variational principles on fibered manifolds**
Jets of differentiable mappings, Lagrange structures, first variation, Euler-Lagrange form, invariant variational functionals, the inverse problem and variational completion, energy-momentum tensors
- 2. Differential invariants and lifting functors**
Differential groups, differential invariants, examples, frames, liftings in principal and associated bundles
- 3. Natural Lagrange structures**
Liftings of diffeomorphisms and vector fields, natural Lagrangians, natural source forms, Euler-Lagrange forms and field equations, conservation laws, Noether's theorems, examples
- 4. Natural variational principles for the metric fields**
The Hilbert variational functional, natural Lagrangians depending on tensors, examples, invariance: conservation laws, Noether's theorems