Abstract in English

We review the problem of defining energy, momentum etc. and their conservation in curved spacetimes and a possible resolution in the form of a background spacetime. Our focus is set on superpotentials, which, when integrated on a spatial boundary, yield conserved charges, while a conserved vector current is a divergence of a superpotential. Within this thesis, we build a minimal mathematical formalism necessary to prove and interpret Noether's theorem which unites symmetries and conservation laws. We emphasize the significance of Killing vector fields – generators of isometries. After a short historical overview, the KBL superpotential is presented in detail, which makes it possible to define conserved quantities with respect to a curved background spacetime. We then employ its generalization within the Horndeski scalar-tensor theory of gravity. We concentrate on a subclass containing non-minimal derivative coupling of the Einstein tensor and a scalar field. We find superpotentials for spherically symmetric, static spacetimes (e.g. exterior of black holes) and time-dependent cosmological spacetimes, in particular with respect to (Anti-)de Sitter backgrounds.