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Title: Lepage forms in Kawaguchi spaces and the Hilbert form

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A well-known construction in geometric mechanics and Riemann -Finsler geometry assigns to a (first order) homogeneous Lagrangian the Hilbert form, serving as an integrand in the corresponding variational functional. Analogous constructions, needed for higher-order mechanics and Finsler–Kawaguchi geometry, have not been found yet. In this paper we construct Lepage equivalents of Lagrangians, satisfying higher-order homogeneity (Zermelo) condition. We show that the homogeneity determines uniquely higher-order momenta and annihilates local Hamiltonians. The resulting Lepage equivalents then represent higher-order generalizations of the Hilbert form. This result extends geometric foundations of variational theory to higher-order parameter-invariant variational functionals.

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