Order reduction and constraints of second-order field theories and higher-order mechanics. Applications to Einstein-Hilbert lagrangian

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The projectability of Cartan form onto a lower-order jet bundle is a consequence of the degenerate character of the corresponding Lagrangian. These systems have special properties, in particular, the order of the corresponding Euler-Lagrange equations is lower than expected. We analyze them using the constraint algorithm for second-order field theories as well as for higher-order mechanics. The results are applied to study the Hilbert Lagrangian for the Einstein equations (in vacuum) from a multisymplectic point of view.

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