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The Hamiltonian Canonical Form for Euler-Lagrange Equations

ZHENG Yu

Department of Mathematics, East China Normal University, Shanghai 200062, China
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Abstract: Based on the theory of calculus of variation, some sufficient conditions are given for some Euler-Lagrange equations to be equivalently represented by finite or even infinite many Hamiltonian canonical equations. Meanwhile, some further applications for equations such as the KdV equation, MKdV equation, the general linear Euler-Lagrange equation and the cylindric shell equations are given.

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Key words: Euler-Lagrange equations, Lagrange multiplier, Hamiltonian system, Hamiltonian operator, Helmholtz condition

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