

*Lagrangians with linear velocities within Riemann-Liouville fractional derivatives*

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The fractional calculus is a name for the theory of integrals and derivatives of arbitrary order, which generalize the notions of  $n$ -fold integration and integer-order differentiation. Differential equations of fractional order appear in certain applied problems and in theoretical researches.

In this report, first of all, some fundamental concepts are considered. Then, Lagrangians linear in velocities are analyzed using the fractional calculus and Euler-Lagrange equations are derived. Two examples are investigated in details, the explicit solutions of Euler-Lagrange equations are obtained and the recovery of the the classical results are discussed.