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Applications of Fractional Calculus to Newtonian Mechanics¹ GABRIELE VARIESCHI, Loyola Marymount University — We investigate some basic applications of Fractional Calculus (FC) to Newtonian mechanics. After a brief review of FC, we consider a possible generalization of Newton's second law of motion and apply it to the case of a body subject to a constant force. In our second application of FC to Newtonian gravity, we consider a generalized fractional gravitational potential and derive the related circular orbital velocities. This analysis might be used as a tool to model galactic rotation curves, in view of the dark matter problem. Both applications have a pedagogical value in connecting fractional calculus to standard mechanics and can be used as a starting point for a more advanced treatment of fractional mechanics.

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