

Abstract

A Geometric View on the Symmetries of Differential Equations [†]

Andronikos Paliathanasis ^{1,2}

¹ Instituto de Ciencias Fisicas y Matematicas, Universidad Austral de Chile, Valdivia 5090000, Chile; anpaliat@phys.uoa.gr

² Institute of Systems Science, Durban University of Technology, PO Box 1334, Durban 4000, South Africa

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We study the Lie and Noether point symmetries of a class of systems of second-order differential equations with n independent and m dependent variables ($n \times m$ systems). We solve the symmetry conditions in a geometric way and determine the general form of the symmetry vector and of the Noetherian conservation laws. We find geometric criteria for the existence and the derivation of the symmetries. Specifically we prove that the point symmetries are generated by the collineations of two (pseudo)metrics, which are defined in the spaces of independent and dependent variables. Applications in systems of physical interests are presented.



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