

Accepted Manuscript

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PII: S0020-7462(17)30446-8

DOI: <http://dx.doi.org/10.1016/j.ijnonlinmec.2017.07.010>

Reference: NLM 2883

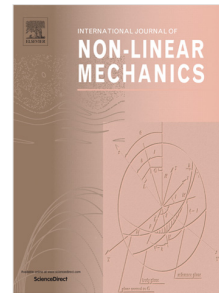
To appear in: *International Journal of Non-Linear Mechanics*

Received date: 1 July 2017

Accepted date: 21 July 2017

Please cite this article as: M. Ruggieri, M.P. Speciale, Conservation laws by means of a new mixed method, *International Journal of Non-Linear Mechanics* (2017), <http://dx.doi.org/10.1016/j.ijnonlinmec.2017.07.010>

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Conservation laws by means of a new mixed method

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Abstract

In this paper, by using a mixed approach, recently introduced by the authors, some conservation laws of partial differential equations are derived. The method merges the Ibragimov's method and the one by Anco and Bluman. In particular, by applying this new mixed method, we determine all zero-th order conservation laws of Chaplygin and Shallow Water equations, as well as new conservation laws for a second order partial differential equation involving an arbitrary function.

Keywords: Conservation laws, Lie point symmetries, differential equations.

1 Introduction

Conservation laws play an important role in the study of nonlinear phenomena, *e.g.*, in the development of appropriate numerical methods, or for investigating existence, uniqueness, and stability of solutions of partial differential

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