The Lie Symmetries and Inverse Problem for the Nonlinear Transfer Equation

R. Cimpoiasu, R. Constantinescu

University of Craiova, 13 A.I.Cuza, 200585 Craiova, Romania

Abstract

The paper will investigate a special type of nonlinear equation, the transfer equation with power law nonlinearities. We shall start with the Lie symmetry problem and then we shall try to generalize the equation towards a whole class of nonlinear equations with the same type of symmetries. We shall apply the so-called inverse problem and we shall see that from the symmetry point of view the transfer equation belongs to the class of nonlinear heat equations. The importance of our investigation is connected with the possibility of reducing the initial equation to a simpler one by using the similarity reduction procedure and, by that, of obtaining particular solutions which can not be deduced directly.

PACS: 05.45.-a, 11.30.Na

Keywords: Lie symmetries, inverse symmetry problem, nonlinear transfer equation.