

Reductions and new exact solutions of the density-dependent Nagumo and Fisher equations

Abstract

We show that conservation laws and their corresponding multipliers can be used to reformulate systems of partial differential equations and obtain some new classes of solutions. By applying the generalized double-reduction theorem to these systems via associated symmetries, one can construct exact solutions. This procedure is applied to specific cases of the density-dependent Nagumo and Fisher equations for which we obtain new solutions that differ in form from the well known analytic and numerical solutions.

Keywords

Double reduction; Exact/closed-form solutions; Fisher equation; Nagumo equation