Nonlinear Differential Equations with Exact Solutions Expressed via the Weierstrass Function

Nikolai A. Kudryashov

Department of Applied Mathematics Moscow Engineering and Physics Institute (State university), 31 Kashirskoe Shosse, 115409 Moscow, Russian Federation

Reprint requests to Prof. N. A. K.; E-mail: kudr@dampe.mephi.ru

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A new problem is studied, that is to find nonlinear differential equations with special solutions expressed via the Weierstrass function. A method is discussed to construct nonlinear ordinary differential equations with exact solutions. The main step of our method is the assumption that nonlinear differential equations have exact solutions which are general solution of the simplest integrable equation. We use the Weierstrass elliptic equation as building block to find a number of nonlinear differential equations with exact solutions. Nonlinear differential equations of the second, third and fourth order with special solutionsexpressed via the Weierstrass function are given. – PACS: 02.30.Hq (Ordinary differential equations)

Key words: Nonlinear Differential Equation; Exact Solution; Weierstrass Function; Nonlinear Evolution Equation.