

Gromak, V. I.; Lukashevich, N. A.

Analytic properties of solutions of Painlevé equations. (Analiticheskie svojstva reshenij uravnenij Penleve.) (Russian. English summary) [Zbl 0752.34003](#)

Minsk: Izdatel'stvo Universitetskoe. 160 p. (1990).

Painlevé equations have the form $w''(z) = R(w, w')$ where R is a rational function of w' and w with analytic coefficients. It is known that there are six types of Painlevé equations such that the remaining 44 have solutions expressible via either elementary functions, or solutions of some linear equations, or solutions of first order equations, or, at last, solutions of the afore-said six equations. The book under review contains exactly six chapters, one for each of the distinguished equations. The authors study immobile singular points and solutions in their neighborhoods, give explicit representations of meromorphic solutions, if any, and study relations between solutions of different equations. Some classes of solutions are expressed via Airy, Bessel, Weber-Hermite and hypergeometric functions. Applications are given to nonlinear equations of mathematical physics.

Reviewer: [V.A.Tkachenko \(Khar'kov\)](#)

MSC:

- [34M55](#) Painlevé and other special ordinary differential equations in the complex domain; classification, hierarchies
- [34-02](#) Research exposition (monographs, survey articles) pertaining to ordinary differential equations
- [34A05](#) Explicit solutions, first integrals of ordinary differential equations
- [30-02](#) Research exposition (monographs, survey articles) pertaining to functions of a complex variable
- [33-02](#) Research exposition (monographs, survey articles) pertaining to special functions

Cited in **1** Review
Cited in **32** Documents

Keywords:

Painlevé equations; immobile singular points; explicit representations of meromorphic solutions; Airy, Bessel, Weber-Hermite and hypergeometric functions; nonlinear equations of mathematical physics