

Painleve Handbook

[DOWNLOAD HERE](#)

1. Introduction. 1.1. Perturbative vs. nonperturbative method. 1.2. A brief history. 1.3. Outline.- 2. Singularity structure in the complex plane, the Painleve test. 2.1. Painleve test of the Lorenz model. 2.2. Test of the Kuramoto-Sivashinsky equation. 2.3. Test of the cubic complex Ginzburg-Landau equation. 2.4. Test of the Duffing-van der Pol oscillator. 2.5. Test of the cubic Henon-Heiles Hamiltonian system. 2.6. The Fuchsian perturbative test. 2.7. The non-Fuchsian perturbative test.- 3. Integrating ordinary differential equations. 3.1. First integrals of the Lorenz model. 3.2. Integration of the four integrable cases of the Lorenz model. 3.3. General traveling wave of KdV equation. 3.4. General traveling wave of NLS equation. 3.5. The partially integrable case. 3.6. Elliptic traveling waves of KS and CGL3. 3.7. Trigonometric traveling waves of Kuramoto-Sivashinsky equation. 3.8. Trigonometric traveling waves of the CGL3 equation. 3.9. General method to find elliptic and trigonometric traveling waves. 3.10. A first integral of the Duffing-van der Pol oscillator. 3.11. Separation of variables in the cubic Henon-Heiles Hamiltonians. 3.12. Direct integration of the cubic Henon-Heiles Hamiltonians. 3.13. Single-valued solutions of the Bianchi IX cosmological model. 3.14. Predictions of the Nevanlinna theory on KS and CGL3.- 4. Painleve property and Painleve test for partial differential equations. 4.1. On reductions. 4.2. Soliton equations. 4.3. Painleve property for PDEs. 4.4. Optimal expansion variable for the Painleve test. 4.5. Painleve test on the example of KdV. 4.6. The case of partially integrable equations, example of KPP.- 5. From the test to explicit solutions of PDEs. 5.1. Information obtained from the Painleve test. 5.2. Two approaches for building the N-soliton solution. 5.3. Lax pair, Darboux and Crum transformations, singular part transformation, nonlinear superposition formula. 5.4. A choice of Lax pairs. 5.5. Algorithm of the singular manifold method. 5.6. The singular manifold method in the integrable case. 5.7. The singular manifold method in the nonintegrable case. 5.8. The singular manifold method under a reduction to an ODE.- 6. Quartic Henon-Heiles Hamiltonian. 6.1. Liouville integrability of the quartic HH Hamiltonians. 6.2. Painleve property of the quartic HH Hamiltonians. 6.4. Final picture for HH3 and HH4.- 7. Discrete nonlinear equations. 7.1. Generalities. 7.2. The discrete Painleve property. 7.3. The test of singularity confinement. 7.4. The test of polynomial growth. 7.5. The test of perturbation of the continuum limit. 7.6.

Discrete Lax pairs. 7.7. Discrete Riccati equation. 7.8. Exact discretization of the Ermakov-Pinney equation. 7.9. Exact discretization of the Weierstrass equation. 7.10. Discrete versions of the NLS equation. 7.11. A sketch of the discrete Painleve equations.- 8. FAQ (Frequently asked questions)- A. The classical results of Painleve and followers- B. Brief presentation of the elliptic functions- C. Basic introduction to the Nevanlinna theory- D. More on the Painleve transcedents. D.1. Coalescence cascade. D.2. Hamiltonian structure. D.3. Lax pairs. D.4. Classical solutions. D.5. Irreducibility.- E. The bilinear operator of Hirota.- F. Algorithm for computing the Laurent series. EAN/ISBN : 9781402084911
Publisher(s): Springer Netherlands Format: ePub/PDF Author(s): Conte, Robert - Musette, Micheline

[DOWNLOAD HERE](#)

Similar manuals:

[Painleve Handbook](#)