

**Laine, Ilpo**

**Complex differential equations.** (English) [Zbl 1209.34002](#)

Battelli, Flaviano (ed.) et al., Handbook of differential equations: Ordinary differential equations. Vol. IV. Amsterdam: Elsevier/North Holland (ISBN 978-0-444-53031-8/hbk). Handbook of Differential Equations, 269-363 (2008).

Research on the properties (existence, order of growth, zeros, poles and fixed points, etc.) of solutions of differential equations in a complex domain and in the unit disc is very important. There has been a fast development in this field and many significant results have been obtained since the 1980s.

In the present text, I. Laine studies and lists many recent results on the growth and value distribution of meromorphic solutions of complex differential equations in the complex plane and in the unit disc, which are not to be found in books such as:

[1] [*I. Laine*, Nevanlinna theory and complex differential equations. de Gruyter Studies in Mathematics. 15. Berlin: W. de Gruyter (1992; [Zbl 0784.30002](#))].

[2] [*G. Jank* and *L. Volkmann*, Einführung in die Theorie der ganzen und meromorphen funktionen mit Anwendungen auf Differentialgleichungen. UTB für Wissenschaft, Große Reihe. Basel etc.: Birkhäuser (1985; [Zbl 0682.30001](#))].

In this text, I. Laine presents results under the following five aspects:

- (1) local theory of complex differential equations;
- (2) linear differential equations in the complex plane;
- (3) linear differential equations in unit disc;
- (4) nonlinear differential equations in the complex plane;
- (5) algebroid solutions of complex differential equations.

This work could be very important to researchers in the field of complex differential equations.

For the entire collection see [[Zbl 1173.34001](#)].

Reviewer: [Zhibo Huang \(Guangzhou\)](#)

**MSC:**

- [34-02](#) Research exposition (monographs, survey articles) pertaining to ordinary differential equations
- [34M03](#) Linear ordinary differential equations and systems in the complex domain
- [34M05](#) Entire and meromorphic solutions to ordinary differential equations in the complex domain
- [30D35](#) Value distribution of meromorphic functions of one complex variable, Nevanlinna theory
- [34M15](#) Algebraic aspects (differential-algebraic, hypertranscendence, group-theoretical) of ordinary differential equations in the complex domain

Cited in **15** Documents

**Keywords:**

[complex differential equations](#)