

**Jank, Gerhard; Volkmann, Lutz**

**Einführung in die Theorie der ganzen und meromorphen Funktionen mit Anwendungen auf Differentialgleichungen. (Introduction to the theory of entire and meromorphic functions with applications to differential equations).** (German) [Zbl 0682.30001](#)

UTB für Wissenschaft, Große Reihe. Basel etc.: Birkhäuser. 256 S. DM 68.00 (1985).

This book is an important continuation into the family of monographs devoted to the Nevanlinna theory of meromorphic functions, see e.g. *R. Nevanlinna* [Eindeutige analytische Funktionen (1974; [Zbl 0278.30002](#))], *W. K. Hayman* [Meromorphic functions (1966; [Zbl 0149.030](#))] and *F. Gross* [Factorization of meromorphic functions (1972; [Zbl 0266.30006](#))]. Compared with these preceding monographs, the present book shows a quite different emphasis. In fact, this appears immediately for the main chapter headings: I. Wachstumseigenschaften ganzer Funktionen, II. Die Nevanlinnaschen Hauptsätze, III. Wachstum und Wertverteilung meromorpher Funktionen, IV. Wachstumsverhalten zusammengesetzter Funktionen, V. Differentialgleichungen mit eindeutigen Lösungen.

The authors have done a great job to work out a rigorous and well-balanced treatment being easy-to-read at the same time. As a consequence, the book contains several interesting features increasing its value, say for graduate studies in Nevanlinna theory. A defective list of such features includes a really well-thought introduction to the Wiman-Valiron theory in Sections 4 and 21, a detailed proof of the Poisson-Jensen- Nevanlinna formula and a rather complete treatment of the iterated order of meromorphic functions. Specially, the Wiman-Valiron introduction is of great value for graduate students to whom the continuation into this area through *W. K. Hayman* [Can. Math. Bull. 17, 317-358 (1974; [Zbl 0314.30021](#))] now becomes much easier. Finally, Chapter V is the first existing presentation devoted to the applications of Nevanlinna theory into complex differential equations which goes beyond a standard survey article. In fact, Chapter V is useful even for an expert of these questions. Of course, eighty pages cannot cover completely an area which has been investigated actively during the last two decades; so the choice of the material in Chapter V reflects the mathematical taste of the authors more than in the preceding four chapters which are more complete in their respective topics. In Chapter III, some readers might have preferred to find explicitly the standard results for the usual notion of order. Now they must be worked out from the given more general assertions using iterated orders.

To summarize, the authors have written a first-class book which is certainly coming to be a standard reference and textbook. The bibliography is not very extensive, containing the most important papers relevant in the areas of the four first chapters, while the last one is perhaps less complete. The reviewer would like to add that after an intensive seminar use of this book for several years already, only a very small amount of misprints have been found.

Reviewer: [I.Laine](#)

#### MSC:

- [30-02](#) Research exposition (monographs, survey articles) pertaining to functions of a complex variable
- [30D30](#) Meromorphic functions of one complex variable (general theory)
- [30D20](#) Entire functions of one complex variable (general theory)

Cited in <b>1</b> Review Cited in <b>73</b> Documents
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