Preface

Nevanlinna theory, one of the great achievement in mathematical research in the 20th century, is an important part of modern function theory. Its basic ideas have been applied in several related fields, such as several complex variables, potential theory, minimal surfaces, and tropical mathematics. The background to this book is the applications of Nevanlinna theory to investigate meromorphic solutions to complex differential equations; see, e. g., the books by Jank and Volkmann [113] and by the second author [120]. Similarly, the uniqueness theory of meromorphic functions, see the book by Yang ad Yi [235], has been an important aspect behind this book. The development of difference Nevanlinna theory 15 years ago naturally prompted to investigating applications of Nevanlinna theory to meromorphic solutions to complex difference equations; see the recent book by Chen [29]. This book presents, in some sense, the next step: applications of Nevanlinna theory to meromorphic solutions to delay-differential equations; these are complex equations that include difference operators such as, e. g., $f(z + c)$ and $f(qz)$, and the derivatives of a meromorphic function $f(z)$. These investigations abound during the last decade. The aim of this book is collecting together what we feel to be the key material within this topic. Perhaps, we should point out here that much of the material referred to in this book speak about difference-differential equations, whereas we prefer to call them as delay-differential equations. We also hope that this collection of recent results is interesting enough to prompt further research in this field, being certainly not yet completely explored.

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