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Linear differential equations and logarithmic derivative estimates. (English) Zbl 1044.34049
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The linear differential equation

$$f^{(k)} + A_{k-1}(z)f^{(k-1)} + \dots + A_0(z)f = 0 \quad (1)$$

is considered, where $A_n(z)$, $n = 0, 1, \dots, k - 1$, are analytic functions in the unit disk $\Delta = \{z : |z| < 1\}$ in the complex plane. Two sharp inequalities for the growth of solutions of certain equations of the form (1) are proved. The obtained results are analogous to the results from [*H. Wittich*, Neuere Untersuchungen über eindeutige analytische Funktionen, Ergebnisse der Mathematik und ihrer Grenzgebiete, 8, 2. korrig. Aufl. Berlin: Springer (1968; [Zbl 0159.10103](#)), Chapter 5, 3] concerning the solutions of equation (1) with polynomial coefficients in the whole complex plane.

To prove the mentioned inequalities, the method of successive approximations and sharp estimates on the logarithmic derivatives of finite-order meromorphic functions in the unit disc are used.

Reviewer: [Natalia Medvedeva \(Chelyabinsk\)](#)

MSC:

- [34M10](#) Oscillation, growth of solutions to ordinary differential equations in the complex domain
- [30D35](#) Value distribution of meromorphic functions of one complex variable, Nevanlinna theory
- [34M05](#) Entire and meromorphic solutions to ordinary differential equations in the complex domain
- [34M45](#) Ordinary differential equations on complex manifolds

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Keywords:

linear differential equation; logarithmic derivative estimates; meromorphic functions; analytic functions; method of successive approximations; Nevanlinna theory

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