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Infinite growth of solutions of second order complex differential equations with entire coefficient having dynamical property. (English) [Zbl 1472.34156]


This paper is concerned with the classical problem on the growth of solutions of second order linear complex differential equations $f'' + A(z)f' + B(z)f = 0$, where $A(z)$ and $B(z)$ are two entire functions as coefficients of this equation. The authors give some properties for these two coefficients to obtain the solutions of the equation having infinite growth order. This topic is a research hotspot and many literatures focused on this research areas. The authors introduce some new methods and technology to get the infinity order of the solutions.

In the main results of this paper the authors suppose that the coefficient $B(z)$ has a dynamical property, that is, has a multiple Fatou component. This property ensures that the maximum and minimum modules of $B(z)$ satisfy an important inequality as $|z| = r$ is in an infinitely logarithmic measure set. The coefficient $A(z)$ satisfies the extreme of Yang’s inequality, which says that for an entire function with nonzero finite lower order the number of its Borel direction is the double of the number of its finite deficient values, or $A(z)$ is a nontrivial solution of another differential equation $u'' + P(z)w = 0$, where $P(z)$ is a polynomial.

In my opinion, this paper is of great significance for future research.

Reviewer: Wenjun Yuan (Guangzhou)

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
34M03 Linear ordinary differential equations and systems in the complex domain

Keywords:

entire function; infinite order; complex differential equation

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References:


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