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Existence of transcendental meromorphic solutions on some types of nonlinear differential equations. (English) [Zbl 1460.34106]

Summary: We show that when $n > m$, the following delay differential equation
\[ f^n(z)f'(z) + p(z)(f(z + c) - f(z)) = r(z)e^{q(z)} \]
of rational coefficients $p, r$ doesn’t admit any transcendental entire solutions $f(z)$ of finite order. Furthermore, we study the conditions of $\alpha_1, \alpha_2$ that ensure existence of transcendental meromorphic solutions of the equation
\[ f^n(z) + f^{n-2}(z)f'(z) + P_d(z, f) = p_1(z)e^{\alpha_1(z)} + p_2(z)e^{\alpha_2(z)}. \]
These results have improved some known theorems obtained most recently by other authors.

MSC:
34M05 Entire and meromorphic solutions to ordinary differential equations in the complex domain
34M04 Nonlinear ordinary differential equations and systems in the complex domain
34M03 Linear ordinary differential equations and systems in the complex domain
34K41 Functional-differential equations in the complex domain
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

Keywords:
transcendental entire solutions; nonlinear differential equations; existence; growth order

Full Text: DOI

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