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**On the zeros of meromorphic solutions of second-order linear differential equations.** (English)

Zbl 0532.34008

Comment. Math. Helv. 58, 656-677 (1983).

This paper is concerned with the differential equation (\*)  $f'' + A(z)f = 0$ , where  $A(z)$  is a meromorphic function on the plane. In an earlier paper [Trans. Am. Math. Soc. 273, 351-363 (1982; Zbl 0505.34026)], the authors investigated (\*) when  $A(z)$  is an entire function, mainly from the point of view of determining the frequency of zeros of solutions. The present paper is an investigation to determine to what extent analogous results hold when  $A(z)$  is meromorphic. The first part of the paper is devoted to determining all meromorphic functions  $A(z)$  for which (\*) has a given property. For example, in Theorem 1, we determine all rational functions  $A(z)$  with a pole at  $\infty$ , for which (\*) possesses two linearly independent meromorphic solutions each having only finitely many zeros. In Theorem 2, all meromorphic  $A(z)$  are determined for which (\*) possesses two linearly independent meromorphic solutions of finite order of growth. In Theorem 3, all meromorphic  $A(z)$  are determined for which (\*) possesses two independent meromorphic solutions each having no zeros. The remaining results mainly involve estimates for the exponents of convergence of the zero and pole sequences of meromorphic solutions of (\*) in the case where the order of  $A(z)$  is finite but not a positive integer, and in the case where the exponent of convergence of the sequence of distinct zeros of  $A(z)$  is less than the order of growth of  $A(z)$ .

**MSC:**

- 34M05** Entire and meromorphic solutions to ordinary differential equations in the complex domain
- 30D35** Value distribution of meromorphic functions of one complex variable, Nevanlinna theory
- 34A30** Linear ordinary differential equations and systems, general

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