

# References

1. L. Ahlfors, Beiträge zur Theorie der meromorphen Funktionen, in *VII Congrès des Mathématiciens Scandinavia* (Oslo, 1929), pp. 84–88
2. L. Ahlfors, *Complex Analysis* (McGraw-Hill, New York, 1979)
3. S. Bank, On zero-free regions for solutions of  $n$ th order linear differential equations. *Comment. Math. Univ. St. Pauli* **36**, 199–213 (1987)
4. S. Bank, A note on the zeros of solutions of  $w'' + P(z)w = 0$ , where  $P$  is a polynomial. *Appl. Anal.* **25**, 29–41 (1988)
5. S. Bank, A note on the location of complex zeros of solutions of linear differential equations. *Complex Variables* **12**, 159–167 (1989)
6. S. Bank, R. Kaufman, On meromorphic solutions of first order differential equations. *Comment. Math. Helv.* **51**, 289–299 (1976)
7. S. Bank, R. Kaufman, On the order of growth of meromorphic solutions of first-order differential equations. *Math. Ann.* **241**, 57–67 (1979)
8. S. Bank, R. Kaufman, On Briot–Bouquet differential equations and a question of Einar Hille. *Math. Z.* **177**, 549–559 (1981)
9. S. Bank, G. Frank, I. Laine, Über die Nullstellen von Lösungen linearer Differentialgleichungen. *Math. Z.* **183**, 355–364 (1983)
10. A. Beardon, T.W. Ng, Parametrizations of algebraic curves. *Ann. Acad. Sci. Fenn.* **31**, 541–554 (2006)
11. W. Bergweiler, On a theorem of Gol'dberg concerning meromorphic solutions of algebraic differential equations. *Complex Variables* **37**, 93–96 (1998)
12. W. Bergweiler, Rescaling principles in function theory, in *Proceedings of the International Conference on Analysis and Its Applications*, 14 p. (2000)
13. W. Bergweiler, Bloch's principle. *Comput. Meth. Funct. Theory (CMFT)* **6**, 77–108 (2006)
14. W. Bergweiler, A. Eremenko, On the singularities of the inverse to a meromorphic function of finite order. *Rev. Matem. Iberoam.* **11**, 355–373 (1995)
15. L. Bieberbach, *Theorie der gewöhnlichen Differentialgleichungen* (Springer, New York, 1965)
16. P. Boutroux, Recherches sur les transcendentes de M. Painlevé et l'étude asymptotique des équations différentielles du seconde ordre. *Ann. École Norm. Supér.* **30**, 255–375 (1913); **31**, 99–159 (1914)
17. D.A. Brannan, W.K. Hayman, Research problems in complex analysis. *Bull. Lond. Math. Soc.* **21**, 1–35 (1989)
18. F. Brüggemann, On the zeros of fundamental systems of linear differential equations with polynomial coefficients. *Complex Variables* **15**, 159–166 (1990)

19. F. Brüggemann, On solutions of linear differential equations with real zeros; proof of a conjecture of Hellerstein and Rossi. *Proc. Am. Math. Soc.* **113**, 371–379 (1991)
20. F. Brüggemann, Proof of a conjecture of Frank and Langley concerning zeros of meromorphic functions and linear differential polynomials. *Analysis* **12**, 5–30 (1992)
21. H. Cartan, Un nouveau théorème d’unicité relatif aux fonctions méromorphes. *C. R. Acad. Sci. Paris* **188**, 301–303 (1929)
22. H. Cartan, Sur les zéros des combinaisons linéaires de  $p$  fonctions holomorphes données. *Math. Cluj* **7**, 5–31 (1933)
23. H. Chen, Y. Gu, An improvement of Marty’s criterion and its applications. *Sci. China Ser. A* **36**, 674–681 (1993)
24. C.T. Chuang, Une généralisation d’une inégalité de Nevanlinna. *Sci. Sinica* **13**, 887–895 (1964)
25. P. Clarkson, J. McLeod, Integral equations and connection formulae for the Painlevé equations, in *Painlevé Transcendents, Their Asymptotics and Physical Applications*, ed. by P. Winternitz, D. Levi (Springer, New York, 1992), pp. 1–31
26. C. Classen, Subnormale Lösungen der vierten Painlevéschen Differentialgleichung, Ph.D. thesis, TU Dortmund (2015)
27. J. Clunie, The derivative of a meromorphic function. *Proc. Am. Math. Soc.* **7**, 227–229 (1956)
28. J. Clunie, On integral and meromorphic functions. *J. Lond. Math. Soc.* **37**, 17–27 (1962)
29. J. Clunie, The composition of entire and meromorphic functions, in *Mathematical Essays Dedicated to A.J. Macintyre* (Springer, New York, 1970), pp. 75–92
30. J. Clunie, W.K. Hayman, The spherical derivative of integral and meromorphic functions. *Comment. Math. Helv.* **40**, 117–148 (1966)
31. T.P. Czubiak, G.G. Gundersen, Meromorphic functions that share pairs of values. *Complex Variables* **34**, 35–46 (1997)
32. W. Doeringer, Exceptional values of differential polynomials. *Pac. J. Math.* **98**, 55–62 (1982)
33. A. Edrei, W.H.J. Fuchs, S. Hellerstein, Radial distribution of the values of a meromorphic function. *Pac. J. Math.* **11**, 135–151 (1961)
34. A. Eremenko, Meromorphic solutions of algebraic differential equations. *Russ. Math. Surv.* **37**, 61–95 (1982)
35. A. Eremenko, Meromorphic solutions of first-order algebraic differential equations. *Funct. Anal. Appl.* **18**, 246–248 (1984)
36. A. Eremenko, Normal holomorphic curves from parabolic regions to projective spaces. arXiv:0710.1281v1 (2007)
37. A. Eremenko, Lectures on Nevanlinna Theory (2012, preprint)
38. A. Eremenko, On the second main theorem of Cartan. *Ann. Acad. Sci. Fenn.* **39**, 859–871 (2014). Correction to the paper “On the second main theorem of Cartan”. *Ann. Acad. Sci. Fenn.* **40**, 503–506 (2015)
39. A. Eremenko, A. Gabrielov, Singular perturbation of polynomial potentials with application to PT-symmetric families. *Mosc. Math. J.* **11**, 473–503 (2011)
40. A. Eremenko, S. Merenkov, Nevanlinna functions with real zeros. III. *J. Math.* **49**, 1093–1110 (2005)
41. A. Eremenko, M. Sodin, Iteration of rational functions and the distribution of the values of the Poincaré function. *J. Sov. Math.* **58**, 504–509 (1992)
42. A. Eremenko, L.W. Liao, T.W. Ng, Meromorphic solutions of higher order Briot–Bouquet differential equations. *Math. Proc. Camb. Phil. Soc.* **146**, 197–206 (2009)
43. S.J. Favorov, Sunyer-i-Balaguer’s almost elliptic functions and Yosida’s normal functions. *J. d’Anal. Math.* **104**, 307–340 (2008)
44. A. Fokas, A. Its, A. Kapaev, V. Novokshënov, *Painlevé Transcendents: The Riemann–Hilbert Approach*. Mathematical Surveys and Monographs, vol. 128 (American Mathematical Society, Providence, RI, 2006)
45. G. Frank, Picardsche Ausnahmewerte bei Lösungen linearer Differentialgleichungen. *Manuscripta Math.* **2**, 181–190 (1970)

46. G. Frank, Über eine Vermutung von Hayman über Nullstellen meromorpher Funktionen. *Math. Z.* **149**, 29–36 (1976)
47. G. Frank, S. Hellerstein, On the meromorphic solutions of nonhomogeneous linear differential equations with polynomial coefficients. *Proc. Lond. Math. Soc.* **53**, 407–428 (1986)
48. G. Frank, G. Weissenborn, Rational deficient functions of meromorphic functions. *Bull. Lond. Math. Soc.* **18**, 29–33 (1986)
49. G. Frank, G. Weissenborn, On the zeros of linear differential polynomials of meromorphic functions. *Complex Variables* **12**, 77–81 (1989)
50. G. Frank, H. Wittich, Zur Theorie linearer Differentialgleichungen im Komplexen. *Math. Z.* **130**, 363–370 (1973)
51. M. Frei, Über die Lösungen linearer Differentialgleichungen mit ganzen Funktionen als Koeffizienten. *Comment. Math. Helvet.* **35**, 201–222 (1961)
52. F. Gackstatter, I. Laine, Zur Theorie der gewöhnlichen Differentialgleichungen im Komplexen. *Ann. Polon. Math.* **38**, 259–287 (1980)
53. V.I. Gavrilo, The behavior of a meromorphic function in the neighbourhood of an essentially singular point. *Am. Math. Soc. Transl.* **71**, 181–201 (1968)
54. V.I. Gavrilo, On classes of meromorphic functions which are characterised by the spherical derivative. *Math. USSR Izv.* **2**, 687–694 (1968)
55. V.I. Gavrilo, On functions of Yosida's class (A). *Proc. Jpn. Acad.* **46**, 1–2 (1970)
56. A.A. Gol'dberg, On single-valued solutions of first order differential equations (Russian). *Ukr. Math. Zh.* **8**, 254–261 (1956)
57. A.A. Gol'dberg, I.V. Ostrovskii, *Value Distribution of Meromorphic Functions*. Translations of Mathematical Monographs, vol. 236 (Springer, Berlin, 2008)
58. W.W. Golubew, *Vorlesungen über Differentialgleichungen im Komplexen* [German transl.] (Dt. Verlag d. Wiss. Berlin, 1958)
59. J. Grahl, Sh. Nevo, Spherical derivatives and normal families. *J. d'Anal. Math.* **117**, 119–128 (2012)
60. V. Gromak, I. Laine, S. Shimomura, *Painlevé Differential Equations in the Complex Plane*. De Gruyter Studies in Mathematical, vol. 28 (Walter de Gruyter, New York, 2002)
61. F. Gross, On the equation  $f^n + g^n = 1$ . *Bull. Am. Math. Soc.* **72**, 86–88 (1966). Erratum *ibid.*, p. 576
62. F. Gross, On the equation  $f^n + g^n = 1$ , II. *Bull. Am. Math. Soc.* **74**, 647–648 (1968)
63. F. Gross, C.F. Osgood, On the functional equation  $f^n + g^n = h^n$  and a new approach to a certain class of more general functional equations. *Indian J. Math.* **23**, 17–39 (1981)
64. X.-Y. Gu, A criterion for normality of families of meromorphic functions (Chinese). *Sci. Sin. Special Issue on Math.* **1**, 267–274 (1979)
65. G.G. Gundersen, Meromorphic functions that share three or four values. *J. Lond. Math. Soc.* **20**, 457–466 (1979)
66. G.G. Gundersen, Meromorphic functions that share four values. *Trans. Am. Math. Soc.* **277**, 545–567 (1983); Correction to “Meromorphic functions that share four values.” *Trans. Am. Math. Soc.* **304**, 847–850 (1987)
67. G. Gundersen, On the real zeros of solutions of  $f'' + A(z)f = 0$ , where  $A$  is entire. *Ann. Acad. Sci. Fenn.* **11**, 275–294 (1986)
68. G.G. Gundersen, Meromorphic functions that share three values IM and a fourth value CM. *Complex Variables* **20**, 99–106 (1992)
69. G. Gundersen, Meromorphic solutions of  $f^6 + g^6 + h^6 = 1$ . *Analysis (München)* **18**, 285–290 (1998)
70. G. Gundersen, Solutions of  $f'' + P(z)f = 0$  that have almost all real zeros. *Ann. Acad. Sci. Fenn.* **26**, 483–488 (2001)
71. G. Gundersen, Meromorphic solutions of  $f^5 + g^5 + h^5 = 1$ . *Complex Variables* **43**, 293–298 (2001)
72. G. Gundersen, Meromorphic functions that share five pairs of values. *Complex Variables Elliptic Equ.* **56**, 93–99 (2011)

73. G. Gundersen, W.K. Hayman, The strength of Cartan's version of Nevanlinna theory. *Bull. Lond. Math. Soc.* **36**, 433–454 (2004)
74. G. Gundersen, E. Steinbart, A generalization of the Airy integral for  $f'' - z^n f = 0$ . *Trans. Am. Math. Soc.* **337**, 737–755 (1993)
75. G. Gundersen, N. Steinmetz, K. Tohge, Meromorphic functions that share four or five pairs of values. Preprint (2016)
76. S. Hastings, J. McLeod, A boundary value problem associated with the second Painlevé transcendent and the Korteweg–de Vries equation. *Arch. Ration. Mech. Anal.* **73**, 31–51 (1980)
77. W.K. Hayman, Picard values of meromorphic functions and their derivative. *Ann. Math.* **70**, 9–42 (1959)
78. W.K. Hayman, *Meromorphic Functions* (Oxford University Press, Oxford, 1964)
79. W.K. Hayman, The local growth of power series: a survey of the Wiman–Valiron method. *Can. Math. Bull.* **17**, 317–358 (1974)
80. W.K. Hayman, Waring's Problem für analytische Funktionen. *Bayer. Akad. Wiss. Math.-Natur. Kl. Sitzungsber.* **1984**, 1–13 (1985)
81. S. Hellerstein, J. Rossi, Zeros of meromorphic solutions of second-order differential equations. *Math. Z.* **192**, 603–612 (1986)
82. S. Hellerstein, J. Rossi, On the distribution of zeros of solutions of second-order differential equations. *Complex Variables Theory Appl.* **13**, 99–109 (1989)
83. G. Hennekemper, W. Hennekemper, Picardsche Ausnahmewerte von Ableitungen gewisser meromorpher Funktionen. *Complex Variables* **5**, 87–93 (1985)
84. E. Hille, *Lectures on Ordinary Differential Equations* (Addison-Wesley, Reading, MA, 1969)
85. E. Hille, *Ordinary Differential Equations in the Complex Domain* (Wiley, New York, 1976)
86. E. Hille, Some remarks on Briot–Bouquet differential equations II. *J. Math. Anal. Appl.* **65**, 572–585 (1978)
87. E. Hille, Second-order Briot–Bouquet differential equations. *Acta Sci. Math. (Szeged)* **40**, 63–72 (1978)
88. A. Hinkkanen, I. Laine, Solutions of the first and second Painlevé equations are meromorphic. *J. d'Anal. Math.* **79**, 345–377 (1999)
89. A. Hinkkanen, I. Laine, Solutions of a modified third Painlevé equation are meromorphic. *J. d'Anal. Math.* **85**, 323–337 (2001)
90. A. Hinkkanen, I. Laine, The meromorphic nature of the sixth Painlevé transcendents. *J. d'Anal. Math.* **94**, 319–342 (2004)
91. A. Hinkkanen, I. Laine, Growth results for Painlevé transcendents. *Math. Proc. Camb. Phil. Soc.* **137**, 645–655 (2004)
92. P.C. Hu, P. Li, C.C. Yang, *Unicity of Meromorphic Mappings* (Kluwer Academic Publishers, Dordrecht/Boston/London, 2003)
93. B. Huang, On the unicity of meromorphic functions that share four values. *Indian J. Pure Appl. Math.* **35**, 359–372 (2004)
94. E.L. Ince, *Ordinary Differential Equations* (Dover Publications, New York, 1956)
95. A. Its, A. Kapaev, Connection formulae for the fourth Painlevé transcendent; Clarkson–McLeod solution. *J. Phys. A: Math. Gen.* **31**, 4073–4113 (1998)
96. G. Jank, L. Volkmann, *Meromorphe Funktionen und Differentialgleichungen* (Birkhäuser, Basel, 1985)
97. Y. Jiang, B. Huang, A note on the value distribution of  $f^l(f^{(k)})^n$ . arXiv:1405.3742.v1 [math.CV] (2014)
98. N. Joshi, A. Kitaev, On Boutroux's tritronquée solutions of the first Painlevé equation. *Stud. Appl. Math.* **107**, 253–291 (2001)
99. T. Kecker, A cubic polynomial Hamiltonian system with meromorphic solutions, in *Computational Methods and Function Theory (CMFT)*, vol. 16 (Springer, Berlin, 2016), pp. 307–317
100. T. Kecker, Polynomial Hamiltonian systems with movable algebraic singularities. *J. d'Anal. Math.* **129**, 197–218 (2016)

101. S. Krantz, *Function Theory of Several Complex Variables* (AMS Chelsea Publishing, Providence, RI, 1992)
102. I. Laine, *Nevanlinna Theory and Complex Differential Equations*. De Gruyter Studies in Mathematics, vol. 15 (De Gruyter, Boston, 1993)
103. J.K. Langley, G. Shian, On the zeros of certain linear differential polynomials. *J. Math. Anal. Appl.* **153**, 159–178 (1990)
104. J.K. Langley, Proof of a conjecture of Hayman concerning  $f$  and  $f''$ . *J. Lond. Math. Soc.* **48**, 500–514 (1993)
105. J.K. Langley, On the zeros of the second derivative. *Proc. R. Soc. Edinb.* **127**, 359–368 (1997)
106. J.K. Langley, An inequality of Frank, Steinmetz and Weissenborn. *Kodai Math. J.* **34**, 383–389 (2011)
107. P. Lappan, A criterion for a meromorphic functions to be normal. *Comment. Math. Helv.* **49**, 492–495 (1974)
108. O. Lehto, K. Virtanen, Boundary behaviour and normal meromorphic functions. *Acta Math.* **97**, 47–65 (1957)
109. A. Lohwater, Ch. Pommerenke, On normal meromorphic functions. *Ann. Acad. Sci. Fenn. Ser. A I* **550**, 12 p. (1973)
110. B.J. Lewin [B.Ya. Levin], *Nullstellenverteilung Ganzer Funktionen* [German transl.] (Akademie Verlag, Berlin, 1962)
111. B.Ya. Levin, *Lectures on Entire Functions*. Translations of Mathematical Monographs, vol. 150 (American Mathematical Society, Providence, RI, 1996)
112. S.A. Makhmutov, Distribution of values of meromorphic functions of class  $\mathcal{H}_p$ . *Sov. Math. Dokl.* **28**, 758–762 (1983)
113. J. Malmquist, Sur les fonctions à un nombre fini de branches satisfaisant à une équation différentielle du premier ordre. *Acta Math.* **36**, 297–343 (1913)
114. J. Malmquist, Sur les fonctions à un nombre fini de branches satisfaisant à une equation différentielle du premier ordre. *Acta Math.* **42**, 59–79 (1920)
115. A.Z. Mokhon'ko, The Nevanlinna characteristics of certain meromorphic functions (Russian). *Teor. Funkcii. Funkc. Anal. Priložen* **14**, 83–87 (1971)
116. A.Z. Mokhon'ko, V.D. Mokhon'ko, Estimates for the Nevanlinna characteristics of some classes of meromorphic functions and their applications to differential equations. *Sib. Math. J.* **15**, 921–934 (1974)
117. E. Mues, Über eine Defekt- und Verzweigungsrelation für die Ableitung meromorpher Funktionen. *Manuscripta Math.* **5**, 275–297 (1971)
118. E. Mues, Zur Faktorisierung elliptischer Funktionen. *Math. Z.* **120**, 157–164 (1971)
119. E. Mues, Über ein Problem von Hayman. *Math. Z.* **164**, 239–259 (1979)
120. E. Mues, Meromorphic functions sharing four values. *Complex Variables* **12**, 169–179 (1989)
121. E. Mues, R. Redheffer, On the growth of logarithmic derivatives. *J. Lond. Math. Soc.* **8**, 412–425 (1974)
122. E. Mues, N. Steinmetz, The theorem of Tumura–Clunie for meromorphic functions. *J. Lond. Math. Soc.* **23**, 113–122 (1981)
123. T. Muir, *A Treatise on the Theory of Determinants* (Dover, New York, 1960)
124. R. Nevanlinna, Zur Theorie der meromorphen Funktionen. *Acta Math.* **46**, 1–99 (1925)
125. R. Nevanlinna, Einige Eindeutigkeitsätze in der Theorie der meromorphen Funktionen. *Acta Math.* **48**, 367–391 (1926)
126. R. Nevanlinna, *Le théorème de Picard–Borel et la théorie des fonctions méromorphes* (Gauthier-Villars, Paris, 1929)
127. R. Nevanlinna, Über Riemannsche Flächen mit endlich vielen Windungspunkten. *Acta Math.* **58**, 295–273 (1932)
128. R. Nevanlinna, *Eindeutige Analytische Funktionen* (Springer, Berlin, 1936)
129. V. Ngoan, I.V. Ostrovskii, The logarithmic derivative of a meromorphic function (Russian). *Akad. Nauk. Armjan. SSR Dokl.* **41**, 742–745 (1965)
130. K. Noshiro, Contributions to the theory of meromorphic functions in the unit-circle. *J. Fac. Sci. Hokkaido Univ.* **7**, 149–159 (1938)

131. K. Okamoto, On the  $\tau$ -function of the Painlevé equations. *Physica D* **2**, 525–535 (1981)
132. K. Okamoto, K. Takano, The proof of the Painlevé property by Masuo Hukuhara. *Funkcial. Ekvac.* **44**, 201–217 (2001)
133. C.F. Osgood, Sometimes effective Thue–Siegel–Roth–Schmidt–Nevanlinna bounds, or better. *J. Number Theory* **21**, 347–389 (1985)
134. P. Painlevé, *Leçons sur la théorie analytique des équations différentielles, professées à Stockholm* (Paris, 1897)
135. P. Painlevé, Mémoire sur les équations différentielles dont l'intégrale générale est uniforme. *Bull. Soc. Math. Fr.* **28**, 201–261 (1900)
136. X. Pang, Bloch's principle and normal criterion. *Sci. China Ser. A* **32**, 782–791 (1989)
137. X. Pang, On normal criterion of meromorphic functions. *Sci. China Ser. A* **33**, 521–527 (1990)
138. X. Pang, Y. Ye, On the zeros of a differential polynomial and normal families. *J. Math. Anal. Appl.* **205**, 32–42 (1997)
139. X. Pang, L. Zalcman, On theorems of Hayman and Clunie. *N. Z. J. Math.* **28**, 71–75 (1999)
140. G. Pólya, G. Szegő, *Aufgaben und Lehrsätze aus der Analysis I, II* (Springer, Berlin, 1970/1971)
141. Ch. Pommerenke, Estimates for normal meromorphic functions. *Ann. Acad. Sci. Fenn. Ser. A I* **476**, 10 p. (1970)
142. M. Reinders, Eindeutigkeitssätze für meromorphe Funktionen, die vier Werte teilen. *Mitt. Math. Sem. Giessen* **200**, 15–38 (1991)
143. M. Reinders, A new example of meromorphic functions sharing four values and a uniqueness theorem. *Complex Variables* **18**, 213–221 (1992)
144. M. Reinders, A new characterisation of Gundersen's example of two meromorphic functions sharing four values. *Results Math.* **24**, 174–179 (1993)
145. A. Ros, The Gauss map of minimal surfaces, in *Differential Geometry, Valencia 2001* (World Scientific Publishing Co., River Edge, NJ, 2002), pp. 235–252
146. L.A. Rubel, *Entire and Meromorphic Functions*. Springer Universitext (Springer, New York, 1996)
147. E. Rudolph, Über meromorphe Funktionen, die vier Werte teilen, Diploma Thesis, Karlsruhe (1988)
148. J. Schiff, *Normal Families*. Springer Universitext (Springer, New York, 1993)
149. H. Selberg, Über die Wertverteilung der algebraischen Funktionen. *Math. Z.* **31**, 709–728 (1930)
150. T. Shimizu, On the theory of meromorphic functions. *Jpn. J. Math.* **6**, 119–171 (1929)
151. S. Shimomura, Painlevé property of a degenerate Garnier system of (9/2)-type and of a certain fourth order non-linear ordinary differential equation. *Ann. Scuola Norm. Sup. Pisa Cl. Sci.* **XXIX**, 1–17 (2000)
152. S. Shimomura, Proofs of the Painlevé property for all Painlevé equations. *Jpn. J. Math.* **29**, 159–180 (2003)
153. S. Shimomura, Growth of the first, the second and the fourth Painlevé transcendents. *Math. Proc. Camb. Phil. Soc.* **134**, 259–269 (2003)
154. S. Shimomura, Poles and  $\alpha$ -points of meromorphic solutions of the first Painlevé hierarchy. *Publ. RIMS Kyoto Univ.* **40**, 471–485 (2004)
155. S. Shimomura, Lower estimates for the growth of the fourth and the second Painlevé transcendents. *Proc. Edinb. Math. Soc.* **47**, 231–249 (2004)
156. K. Shin, New polynomials  $P$  for which  $f'' + P(z)f = 0$  has a solution with almost all real zeros. *Ann. Acad. Sci. Fenn.* **27**, 491–498 (2002)
157. G.D. Song, J.M. Chang, Meromorphic functions sharing four values. *Southeast Asian Bull. Math.* **26**, 629–635 (2002)
158. L. Sons, Deficiencies of monomials. *Math. Z.* **111**, 53–68 (1969)
159. R. Spigler, The linear differential equation whose solutions are the products of solutions of two given differential equations. *J. Math. Anal. Appl.* **98**, 130–147 (1984)
160. N. Steinmetz, Zur Theorie der binomischen Differentialgleichungen. *Math. Ann.* **244**, 263–274 (1979)

161. N. Steinmetz, Ein Malmquistscher Satz für algebraische Differentialgleichungen erster Ordnung. *J. Reine Angew. Math.* **316**, 44–53 (1980)
162. N. Steinmetz, Über die Nullstellen von Differentialpolynomen. *Math. Z.* **176**, 255–264 (1981)
163. N. Steinmetz, Über eine Klasse von Painlevéschen Differentialgleichungen. *Arch. Math.* **41**, 261–266 (1983)
164. N. Steinmetz, Eine Verallgemeinerung des zweiten Nevanlinnaschen Hauptsatzes. *J. Reine Angew. Math.* **368**, 134–141 (1986)
165. N. Steinmetz, Ein Malmquistscher Satz für algebraische Differentialgleichungen zweiter Ordnung. *Results Math.* **10**, 152–166 (1986)
166. N. Steinmetz, On the zeros of  $(f^{(p)} + a_{p-1}f^{(p-1)} + \cdots + a_0f)f$ . *Analysis* **7**, 375–389 (1987)
167. N. Steinmetz, Meromorphe Lösungen der Differentialgleichung  $Q(z, w)\frac{d^2w}{dz^2} = P(z, w)\left(\frac{dw}{dz}\right)^2$ . *Complex Variables* **10**, 31–41 (1988)
168. N. Steinmetz, A uniqueness theorem for three meromorphic functions. *Ann. Acad. Sci. Fenn.* **13**, 93–110 (1988)
169. N. Steinmetz, On the zeros of a certain Wronskian. *Bull. Lond. Math. Soc.* **20**, 525–531 (1988)
170. N. Steinmetz, Meromorphic solutions of second order algebraic differential equations. *Complex Variables* **13**, 75–83 (1989)
171. N. Steinmetz, Exceptional values of solutions of linear differential equations. *Math. Z.* **201**, 317–326 (1989)
172. N. Steinmetz, Linear differential equations with exceptional fundamental sets. *Analysis* **11**, 119–128 (1991)
173. N. Steinmetz, Linear differential equations with exceptional fundamental sets II. *Proc. Am. Math. Soc.* **117**, 355–358 (1993)
174. N. Steinmetz, *Iteration of Rational Functions. Complex Analytic Dynamical Systems*. De Gruyter Studies in Mathematics, vol. 16 (Walter de Gruyter, Berlin, 1993)
175. N. Steinmetz, On Painlevé's equations I, II and IV. *J. d'Anal. Math.* **82**, 363–377 (2000)
176. N. Steinmetz, Value distribution of the Painlevé transcendents. *Isr. J. Math.* **128**, 29–52 (2002)
177. N. Steinmetz, Zalcman functions and rational dynamics. *N. Z. J. Math.* **32**, 1–14 (2003)
178. N. Steinmetz, Normal families and linear differential equations. *J. d'Anal. Math.* **117**, 129–132 (2012)
179. N. Steinmetz, The Yosida class is universal. *J. d'Anal. Math.* **117**, 347–364 (2012)
180. N. Steinmetz, Sub-normal solutions to Painlevé's second differential equation. *Bull. Lond. Math. Soc.* **45**, 225–235 (2013)
181. N. Steinmetz, Reminiscence of an open problem. Remarks on Nevanlinna's four-points theorem. *South East Asian Bull. Math* **36**, 399–417 (2012)
182. N. Steinmetz, Complex Riccati differential equations revisited. *Ann. Acad. Sci. Fenn.* **39**, 503–511 (2014)
183. N. Steinmetz, Remark on meromorphic functions sharing five pairs. *Analysis* **36**, 169–179 (2016)
184. N. Steinmetz, An old new class of meromorphic functions. Preprint (2014), to appear in *J. d'Anal. Math.*
185. N. Steinmetz, First order algebraic differential equations of genus zero. *Bull. Lond. Math. Soc.* **49**, 391–404 (2017). doi:10.1112/blms.12035
186. N. Steinmetz, A unified approach to the Painlevé transcendents. *Ann. Acad. Sci. Fenn.* **42**, 17–49 (2017)
187. W. Sternberg, Über die asymptotische Integration von Differentialgleichungen. *Math. Ann.* **81**, 119–186 (1920)
188. E.C. Titchmarsh, *Eigenfunction Expansions Associated with Second-Order Differential Equations, Part I*, 2nd edn. (Oxford University Press, London, 1962)
189. M. Tsuji, On the order of a meromorphic function. *Tōhoku Math. J.* **3**, 282–284 (1951)
190. H. Ueda, Some estimates for meromorphic functions sharing four values. *Kodai Math. J.* **17**, 329–340 (1994)

191. G. Valiron, Sur le théorème de M. Picard. *Enseignement* **28**, 55–59 (1929)
192. G. Valiron, Sur la dérivée des fonctions algébroides. *Bull. Soc. Math. Fr.* **59**, 17–39 (1931)
193. G. Valiron, *Lectures on the General Theory of Integral Functions* (Chelsea Publishing, New York, 1949)
194. S.P. Wang, On meromorphic functions that share four values. *J. Math. Anal. Appl.* **173**, 359–369 (1993)
195. Y. Wang, On Mues conjecture and Picard values. *Sci. China Ser. A* **36**, 28–35 (1993)
196. J.P. Wang, Meromorphic functions sharing four values. *Indian J. Pure Appl. Math.* **32**, 37–46 (2001)
197. W. Wasow, *Asymptotic Expansions for Ordinary Differential Equations* (Wiley, New York, 1965)
198. G. Weissenborn, The theorem of Tumura and Clunie. *Bull. Lond. Math. Soc.* **18**, 371–373 (1986)
199. J.M. Whittaker, The order of the derivative of a meromorphic function. *Proc. Lond. Math. Soc.* **40**, 255–272 (1936)
200. A. Wiman, Über den Zusammenhang zwischen dem Maximalbetrage einer analytischen Funktion und dem größten Gliede der zugehörigen Taylorschen Reihe. *Acta Math.* **37**, 305–326 (1914)
201. H. Wittich, Eindeutige Lösungen der Differentialgleichungen  $w'' = P(z, w)$ . *Math. Ann.* **125**, 355–365 (1953)
202. H. Wittich, *Neuere Untersuchungen über eindeutige Analytische Funktionen* (Springer, Berlin, 1968)
203. K. Yamanoi, The second main theorem for small functions and related problems. *Acta Math.* **192**, 225–294 (2004)
204. K. Yamanoi, Defect relation for rational functions as targets. *Forum Math.* **17**, 169–189 (2005)
205. K. Yamanoi, Zeros of higher derivatives of meromorphic functions in the complex plane. *Proc. Lond. Math. Soc.* **106**, 703–780 (2013)
206. S. Yamashita, On K. Yosida's class (A) of meromorphic functions. *Proc. Jpn. Acad.* **50**, 347–378 (1974)
207. N. Yanagihara, Meromorphic solutions of some difference equations. *Funkc. Ekvac.* **23**, 309–326 (1980)
208. K. Yosida, A generalisation of a Malmquist's theorem. *Jpn J. Math.* **9**, 253–256 (1932)
209. K. Yosida, On algebroid solutions of ordinary differential equations. *Jpn. J. Math.* **10**, 253–256 (1933)
210. K. Yosida, On a class of meromorphic functions. *Proc. Phys. Math. Soc. Jpn.* **16**, 227–235 (1934)
211. K. Yosida, A note on Malmquist's theorem on first order algebraic differential equations. *Proc. Jpn. Acad.* **53**, 120–123 (1977)
212. L. Zalcman, A heuristic principle in function theory. *Am. Math. Monthly* **82**, 813–817 (1975)
213. L. Zalcman, Normal families: new perspectives. *Bull. Am. Math. Soc.* **35**, 215–230 (1998)



# Index

- Abel function, 117
- Abel's functional equation, 118
- Ahlfors–Shimizu formula, 39, 59
- Ahlfors–Shimizu formula modified, 131
- Airy equation, 188
- Airy function, 212
- Airy solution, 188
- algebraic curve, 5
- algebraic degree, 5
- algebraic differential equation, 78
- algebraic function, 2
- algebraic pole, 3
- algebraic singularity, 3
- algebroid function, 63
- almost entire, 88
- analytic dependence, 16
- Arzelà–Ascoli Theorem, 6
- asymptotic expansion, 19
- asymptotic series, 19
  
- Bäcklund transformation (II), 188
- Bäcklund transformation (IV), 222
- Bäcklund transformation (IV), 178
- Bernoulli number, 20
- binomial differential equation, 160
- Bloch's principle, 122
- Borel exceptional value, 53
- Borel Identity, 61
- Borel's Theorem, 53
- Borel–Carathéodory inequality, 69
- Briot–Bouquet equation, 161
  
- calcul des limites, 14
- canonical form of Riccati equations, 148
- canonical product, 41
- Cartan characteristic, 58
- Cartan's First Main Theorem, 59
- Cartan's Identity, 38
- Cartan's Second Main Theorem, 60
- Cauchy's Existence Theorem, 11
- central index, 29
- chordal metric, 6
- Clarkson–McLeod solution, 212
- Clunie's Lemma, 79
- cluster set, 149
- cluster set of (IV), 197
- cluster set of Painlevé (I), (II), (IV), 202
- continuous dependence, 16
- counting function, 35
- cross-ratio, 31
  
- deficiency, 47
- deficiency relation, 47
- deficient value, 47
- degree of a differential polynomial, 79
- differential equation, 9
- differential polynomial, 79
- discriminant, 1
- doubly periodic function, 24
  
- elliptic curve, 5
- elliptic function, 24

- elliptic order, 24
- elliptic parametrisation, 5
- entire curve, 58
- Eremenko's Lemma, 77
- exceptional fundamental set, 143
- exponent of convergence, 41
- exponential polynomial, 143
  
- Five-Value Theorem, 94
- Four-Value Theorem, 97
- Frei's Theorem, 138
- fundamental set, 12
- fundamental system, 12
  
- Gamma function, 37
- genus of a canonical product, 41
- genus of a meromorphic function, 53
- genus of an algebraic curve, 5
- Gol'dberg Conjecture, 52
- Green's formula, 39
- Green's function, 33
- Gronwall's Lemma, 12
- Gundersen's example, 95
  
- Hadamard's Theorem, 52
- Hamiltonian, 178
- Hamiltonian system, 177
- harmonic measure, 25
- Hartogs' Theorem, 10
- Hastings–McLeod solution, 212
- Hayman's alternative, 91
- Hurwitz' Theorem, 6
  
- Implicit Function Theorem, 15
- irreducible, 1
- isomonodromic deformation, 176
  
- Jacobi's elliptic functions, 25
- Jensen's formula, 34
- Jensen's inequality, 45
- Julia set, 118
  
- Laplace transformation, 154
- lattice, 24
- lattice structure, 199
- Lemma on the Logarithmic Derivative, 44
  
- Liouville's Theorem, 24
- locally univalent, 157
- Lyapunov function, 183
  
- Malmquist's First Theorem, 76
- Malmquist's Second Theorem, 78, 158
- Malmquist-type theorem, 180
- Marty's Criterion, 9
- maximum modulus, 40
- maximum term, 28
- minimal polynomial, 63
- Montel's Criterion, 6
- Montel's Second Criterion, 120
- movable singularity, 175
- Mues Conjecture, 52
  
- Nevanlinna characteristic, 36
- Nevanlinna's First Main Theorem, 36
- Nevanlinna's Second Main Theorem, 46
- Nevanlinna's Third Main Theorem, 62
- Newton–Puiseux polygon, 4
- Ngoan–Ostrovskii Lemma, 43
- normal family of holomorphic functions, 6
- normal family of meromorphic functions, 9
- normal function, 120
  
- order of a Weber–Hermite solution, 201
- order of growth, 40
  
- Painlevé hierarchy, 205
- Painlevé property, 173
- Painlevé story, 175
- Painlevé test, 174
- Painlevé transcendent, 176
- Painlevé's Theorem, 17
- Painlevé–Yosida Theorem, 188
- parabolic fixed point, 117
- Phragmén–Lindelöf indicator, 141
- Phragmén–Lindelöf principle, 26
- Picard exceptional value, 47
- Picard's Great Theorem, 120
- Picard's Little Theorem, 119
- Poincaré density, 121
- Poincaré function, 115
- Poisson kernel, 33
- Poisson–Jensen formula, 33
- pole-free sector, 152
- proximity function, 35
- Puiseux series, 3

- ramification index, 56
- ramified value, 55
- rational curve, 5
- rational parametrisation, 5
- repelling fixed point, 115
- resonance condition, 178
- Riccati differential equation, 18
- Riemann–Hilbert method, 176
  
- Schröder’s functional equation, 116
- Schwarzian derivative, 30
- Selberg characteristic, 64
- Selberg–Valiron First Main Theorem, 66
- Selberg–Valiron Second Main Theorem, 70
- singular solution, 159
- small function, 48
- spherical characteristic, 40
- spherical derivative, 9
- spherical derivative modified, 130
- spherical First Main Theorem, 40
- stereographic projection, 7
- Stirling’s formula, 20
- Stokes ray, 149
- Stokes sector, 149
- string, 136
- string of poles, 199
- string structure, 199
- sub-normal solution, 141
- sub-normal solution (II), 214
- sub-normal solution (linear), 213
- sub-normal solution (IV), (IV), 218
- subdominant solution, 154
  
- triply truncated solution, 212
- truncated solution, 153
- Tumura–Clunie Theorem, 54
- Two-Constants Theorem, 26
  
- Valiron characteristic, 65
- Valiron’s Lemma, 37, 75
- Vitali’s Theorem, 6
  
- Weber–Hermite equation, 189
- Weber–Hermite solution, 189
- Weierstraß P-function, 24
- Weierstraß prime factor, 41
- Weierstraß’ Theorem, 6
- weight of a differential polynomial, 79
- Wittich–Mokhon’ko Lemma, 79
- Wronskian determinant, 12
  
- Yosida class, 130
- Yosida function, 129
- Yosida property, 174
- Yosida re-scaling, 195
- Yosida test, 189
- Yosida–Zalcman–Pang re-scaling, 190
  
- Zalcman function, 118
- Zalcman’s Lemma, 114
- Zalcman–Pang Lemma, 114