zbMATH Open
THE FIRST RESOURCE FOR MATHEMATICS

Campana, C.; Hounie, J.
Strong uniqueness results for first-order planar equations. (English) Zbl 1442.35007
J. Differ. Equations 269, No. 10, 7792-7824 (2020).

Summary: We discuss strong uniqueness results in the forward Cauchy Problem for a class of complex fist-order equations with Hölder coefficients defined in the plane. We use an appropriate variant of the similarity principle in order to reduce the original question to a local version of Riesz's uniqueness theorem for holomorphic functions.

MSC:

35A02 Uniqueness problems for PDEs: global uniqueness, local uniqueness, non-uniqueness
35F10 Initial value problems for linear first-order PDEs
30G20 Generalizations of Bers and Vekua type (pseudoanalytic, p-analytic, etc.)
35J70 Degenerate elliptic equations

Keywords:

locally integral vector fields, similarity principle, Riesz's uniqueness theorem

Full Text: DOI

References:

[1] Berhanu, S.; Cordaro, P. D.; Hounie, J., An Introduction to Involutive Structures (2008), Cambridge University Press · Zbl 1151.35011

[2] Bers, L., An outline of the theory of pseudoanalytic functions, Bull. Am. Math. Soc., 62, 291-331 (1956) · Zbl 0072.07703

[3] Berhanu, S.; Hounie, J., A strong uniqueness theorem for planar vector fields, Bol. Soc. Bras. Mat., 32, 3, 359-376 (2001) · Zbl 1043.35051

[4] Campana, C.; Dattori da Silva, P. L.; Meziani, A., Properties of solutions of a class of hypocomplex vector fields, Contemp. Math., 681, 29-50 (2017) · Zbl 1362.35088

[5] Campana, C.; Dattori da Silva, P. L.; Meziani, A., Riemann-Hilbert problem for a class of hypocomplex vector fields, Complex Var. Elliptic Equ., 62, 10, 1413-1424 (2017) · Zbl 1375.35293

[6] Campana, C.; Dattori da Silva, P. L.; Meziani, A., A class of planar vector fields with homogeneous singular points: solvability and boundary value problems, J. Differ. Equ., 265, 5297-5314 (2018) · Zbl 1397.35066

[7] Campana, C.; Meziani, A., Boundary value problems for a class of planar complex vector fields, J. Differ. Equ., 261, 10, 5609-5636 (2016) · Zbl 1352.35086

[8] Cohen, P., The non-uniqueness of the Cauchy problem (1960), O.N.R. Tech. Report 93; Stanford

[9] Cordaro, P. D., Approximate solutions in locally integrable structures, (Differential Equations and Dynamical Systems. Differential Equations and Dynamical Systems, Lisbon, 2000. Differential Equations and Dynamical Systems. Differential Equations and Dynamical Systems, Lisbon, 2000, Fields Inst. Commun., vol. 31 (2002), Amer. Math. Soc.), 97-112 · Zbl 1003.35007

[10] Duren, P., Theory of \(H^p\) Spaces (1970), Academic Press · Zbl 0215.20203

[11] Hörmander, L., Linear Partial Differential Operators, Die Grundlehren der math. Wissen-Schaften, Band 116 (1963), Academic Press: Academic Press New York, Spring-Verland, Berlin · Zbl 0171.06802

[12] Meziani, A., On real analytic planar vector fields near the characteristic set, Contemp. Math., 251, 429-438 (2000) · Zbl 0960.35016

[13] Meziani, A., A class of planar hypocomplex vector fields: solvability and boundary value problems, (Mathematical Analysis and Applications-Plenary Lectures, ISAAC 2017. Mathematical Analysis and Applications-Plenary Lectures, ISAAC 2017, Växjö, Sweden (2018)), 83-107 · Zbl 1428.35083

[14] Meziani, A.; Zugliani, G., A class of hypocomplex structures on the two-dimensional torus, Proc. Am. Math. Soc., 147, 3937-3946 (2019) · Zbl 1421.35050

[15] Pommerenke, C., Boundary Behaviour of Conformal Maps (1992), Springer-Verlag · Zbl 0762.30001

[16] Stein, E. M., Singular Integrals and Differentiability Properties of Functions (1970), Princeton Univ. Press · Zbl 0207.13501

[17] Treves, F., Hypo-Analytic Structures: Local Theory, Princeton Mathematical Series, vol. 40 (1992), Princeton Univ. Press: Princeton Univ. Press NJ · Zbl 0787.35003

[18] Vekua, I. N., Generalized Analytic Functions (1962), Pergamon Press: Pergamon Press Oxford · Zbl 0127.03505