

Li, Zunfeng; Qiao, Yuying; Cao, Nanbin

Some properties of a T operator with B-m kernel in the complex Clifford analysis. (English)

Zbl 07445942

J. Inequal. Appl. 2018, Paper No. 226, 11 p. (2018)

Summary: Teodorescu operator, or T-operator, plays an important role in Vekua equation systems and the generalized analytic function theory. It is a generalized solution to the nonhomogeneous Dirac equation. The properties of T operators play a key role in the study of boundary value problems and integral representation of the solutions. In this paper, we first define a Teodorescu operator with B-M kernel in the complex Clifford analysis and prove the boundedness of this operator. Then we give an inequality similar to the classical Hile lemma about real vector which plays a key role in the following proof. Finally, we prove the Hölder continuity and γ -integrability of this operator.

MSC:

- 30G35 Functions of hypercomplex variables and generalized variables
- 30E20 Integration, integrals of Cauchy type, integral representations of analytic functions in the complex plane
- 32A30 Other generalizations of function theory of one complex variable
- 30A05 Monogenic and polygenic functions of one complex variable
- 47B91 Operators on complex function spaces
- 15A66 Clifford algebras, spinors

Keywords:

complex Clifford analysis; Teodorescu operator; boundedness; Hölder continuity; γ -integrability

Full Text: [DOI](#)

References:

- [1] Brack, F., Delanghe, R., Sommen, F.: Clifford Analysis. Pitman, Boston (1982) · Zbl 0529.30001
- [2] Eriksson, S. L.; Leutwiler, H., Hypermonogenic function, 287-302 (2000), Boston · Zbl 0965.30020 · doi:10.1007/978-1-4612-1374-1_16
- [3] Eriksson, S.L.: Integral formulas for hypermonogenic functions. Bull. Belg. Math. Soc. Simon Stevin 11, 705-718 (2004) · Zbl 1071.30047
- [4] Eriksson, S.L., Leutwiler, H.: An improved Cauchy formula for hypermonogenic functions. Adv. Appl. Clifford Algebras 19, 269-282 (2009) · Zbl 1172.30027 · doi:10.1007/s00006-009-0153-8
- [5] Eriksson, S. L.; Leutwiler, H., Hypermonogenic functions and their Cauchy-type theorems, 97-112 (2004) · Zbl 1057.30040 · doi:10.1007/978-3-0348-7838-8_5
- [6] Huang, S., Qiao, Y.Y., Wen, G.C.: Real and Complex Clifford Analysis. Springer, New York (2006) · Zbl 1096.30042
- [7] Qiao, Y. Y.; Ryan, J., Orthogonal projections on hyperbolic space, No. 238, 111-120 (2005), Boston · Zbl 1086.30042 · doi:10.1007/0-8176-4416-4_9
- [8] Qiao, Y.Y., Bernstein, S., Eriksson, S.L.: Function theory for Laplace and Dirac-Hodge operators on hyperbolic space. J. Anal. Math. 98, 43-63 (2006) · Zbl 1135.58013 · doi:10.1007/BF02790269
- [9] Li, Z.F., Yang, H.J., Qiao, Y.Y., Guo, B.C.: Some properties of T-operator with bihypermonogenic kernel in Clifford analysis. Complex Var. Elliptic Equ. 62, 938-956 (2017) · Zbl 1371.30045 · doi:10.1080/17476933.2016.1254203
- [10] Xie, Y.H., Zhang, X.F., Tang, X.M.: Some properties of k-hypergenic functions in Clifford analysis. Complex Var. Elliptic Equ. 61, 1614-1626 (2016) · Zbl 1345.30077 · doi:10.1080/17476933.2016.1193492
- [11] Xie, Y.H.: Boundary properties of hypergenic-Cauchy type integrals in Clifford analysis. Complex Var. Elliptic Equ. 59, 599-615 (2014) · Zbl 1291.30017 · doi:10.1080/17476933.2012.744403
- [12] Xie, Y.H., Yang, H.J., Qiao, Y.Y.: Complex k-hypermonogenic functions in complex Clifford analysis. Complex Var. Elliptic Equ. 58, 1467-1479 (2013) · Zbl 1284.30053 · doi:10.1080/17476933.2012.686496
- [13] Yang, H.J., Zhao, X.H.: The fixed point and Mann iterative of a kind of higher order singular Teodorescu operator. Complex Var. Elliptic Equ. 60, 1658-1667 (2015) · Zbl 1327.30060 · doi:10.1080/17476933.2015.1041110
- [14] Yang, H.J., Qiao, Y.Y., Xie, Y.H., Wang, L.P.: Cauchy integral formula for k-monogenic function with α -weight applied

Clifford algebra. Adv. Appl. Clifford Algebras 28, 1-14 (2018) · [Zbl 1394.30037](#) · [doi:10.1007/s00006-018-0825-3](#)

- [15] Yang, H.J., Qiao, Y.Y., Huang, S.: Some properties of Cauchy-type singular integrals in Clifford analysis. J. Math. Res. Appl. 32, 189-200 (2012) · [Zbl 1265.30190](#)
- [16] Ryan, J.: Complexified Clifford analysis. Complex Var. Theory Appl. 1, 119-149 (1982)
- [17] Ryan, J.: Singularities and Laurent expansions in complex Clifford analysis. Appl. Anal. 16, 33-49 (1983) · [Zbl 0536.32003](#) · [doi:10.1080/00036818308839457](#)
- [18] Ryan, J.: Iterated Dirac operators in $\mathbb{C}l_n$. Z. Anal. Anwend. 9, 385-401 (1990) · [Zbl 0758.47039](#) · [doi:10.4171/ZAA/410](#)
- [19] Ryan, J.: Intrinsic Dirac operators in $\mathbb{C}l_n$. Adv. Math. 118, 93-133 (1996) · [Zbl 0852.32005](#) · [doi:10.1006/aima.1996.0019](#)
- [20] Ku, M., Du, J.Y., Wang, D.S.: Some properties of holomorphic Cliffordian functions in complex Clifford analysis. Acta Math. Sci. 30, 747-768 (2010) · [Zbl 1240.22009](#) · [doi:10.1016/S0252-9602\(10\)60076-8](#)
- [21] Ku, M., Du, J.Y., Wang, D.S.: On generalization of Martinelli-Bochner integral formula using Clifford analysis. Adv. Appl. Clifford Algebras 20, 351-366 (2010) · [Zbl 1206.30069](#) · [doi:10.1007/s00006-009-0172-5](#)
- [22] Gilbert, R.P., Buchanan, J.L.: First Order Elliptic Systems, a Function Theoretic Approach. Academic Press, New York (1983) · [Zbl 0529.35006](#)
- [23] Vekua, I.N.: Generalized Analytic Functions. Pergamon, Oxford (1962) · [Zbl 0127.03505](#)

This reference list is based on information provided by the publisher or from digital mathematics libraries. Its items are heuristically matched to zbMATH identifiers and may contain data conversion errors. It attempts to reflect the references listed in the original paper as accurately as possible without claiming the completeness or perfect precision of the matching.