
ON CONSTRUCTING FRAME FIELDS OF A SPLIT OCTONIONIC CURVE WITH AN ASSOCIATED SPATIAL SPLIT OCTONIONIC CURVE

Jeta ALO¹ Mücahit AKBIYIK^{2,*}

^{1,2}Department of Mathematics, Istanbul Beykent University, Istanbul 34520, Turkey .

ABSTRACT

In this presentation, we will define an associated spatial split octonionic curve for a given split octonionic curve. We construct frame formulas for the split octonionic curve by using the G_2 - frame and Frenet-Serret frame of the associated spatial split curve.

Keywords Frenet-Serret Frame · G_2 Frame · Derivative formulas

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References

- [1] B. Cheng, Frenet Formulas in N-dimensions and some Applications, Pi Mu Epsilon Journal, Vol. 7, No. 10 (SPRING 1984), pp. 629-635.
- [2] N. Ekmekci, K. İarsalan, Higher curves in Lorentzian space. Journal of Inst. of Math. and Comp. Sci. (Mat. Ser.), 11, 2, 97-102.
- [3] M. Ohashi, G 2-Congruence theorem for curves in purely imaginary octonions and its application. Geom Dedicata 163, 1–17 (2013). <https://doi.org/10.1007/s10711-012-9733-1>
- [4] K. Bharathi, M. Nagaraj, Quaternion valued function of a real variable Serret–Frenet formulae, Indian J. Pure Appl. Math. 16 (1985) 741–756.
- [5] A.C. Coken and A. Tuna, On the quaternionic inclined curves in the semi-Euclidean space \mathbb{E}_2^4 , Appl. Math. Comput. 155 (2004), 373-389.
- [6] A. Dağdeviren, S. Yüce, Dual Quaternions and Dual Quaternionic Curves, Filomat 33:4 (2019), 1037–1046, <https://doi.org/10.2298/FIL1904037D>
- [7] J.P. Ward, Quaternions and Cayley Numbers Algebra and Applications, Kluwer Academic Publishers, London, 1997.
- [8] M. Gogberashvili, “Observable algebra,” <http://arxiv.org/abs/hep-th/0212251>.
- [9] M. Gogberashvili, “Octonionic geometry,” Advances in Applied Clifford Algebras, vol. 15, no. 1, pp. 55–66, 2005.
- [10] M. Gogberashvili, “Octonionic electrodynamics,” Journal of Physics A, vol. 39, no. 22, pp. 7099–7104, 2006.
- [11] M. Gogberashvili, “Octonionic version of Dirac equations,” International Journal of Modern Physics A, vol. 21, no. 17, pp. 3513–3524, 2006.
- [12] M. Gogberashvili, O. Sakhelashvili “Geometrical Applications of split-octonions,” Advances in Mathematical Physics Volume 2015, Article ID 196708, 14 pages.
- [13] O. Bektaş Split-type octonion matrix. Math Methods Appl Sci. 2018; 42(16).

*Corresponding Author’s E-mail: mucahitakbiyik@beykent.edu.tr

- [14] K.Carmody, Circular and hyperbolic quaternions, octonions, and sedenions. *Appl Math Comput.* 1988;28:47-72.
- [15] M.Tanşlı, M.E. Kansu, S.Demir, A new approach to Lorentz invariance in electromagnetism with hyperbolic octonions. *Eur Phys J Plus.* 2012;127(69):1-12.
- [16] S. Demir, M. Tanşlı, Hyperbolic octonion formulation of the fluid maxwell equations. *J Korean Phys Soc.* 2016;68(5):616-623.
- [17] N. Candemir, M, Tanşlı, K. Özdas, S. Demir Hyperbolic octonionic Proca-Maxwell equations. *Z Naturforsch.* 2008;63:15-18.
- [18] S. Demir, M. Tanşlı, M. E. Kansu, Generalized hyperbolic octonion formulation for the fields of massive Dyons and Graviton-Dyons. *Int J Theor Phys.* 2016;52:3696-3711.
- [19] M. Akbıyık, On Powers and Roots of Split Octonions. *Journal of Mathematics.* 2023, 2314-4629.
- [20] A. Cariow, G. Cariowa, J. Knapinski Derivation of a low multiplicative complexity algorithm for multiplying hyperbolic octonions. 2015:1-15. arXiv:1502.06250.
- [21] Jeta Alo, Mücahit Akbıyık, On split-octonionic curves, *Logic Journal of the IGPL*, 2024, jzae039, <https://doi.org/10.1093/jigpal/jzae039>