

REVERSIBLE GEODESICS AND T -TENSOR OF FINSLER SPACE WITH RANDER'S CHANGE MATSUMOTO TYPE (α, β) -METRIC

BRIJESH KUMAR TRIPATHI AND SEJAL PRAJAPATI

ABSTRACT. The aim of this paper is to investigate the reversible geodesics and the T -tensor of a Finsler space endowed with the Rander's change Matsumoto type (α, β) -metric. We obtain the condition for reversible geodesics in a Finsler space (M, F) . We use reversible geodesics to analyze the geometrical properties of the Finsler metric F . Our findings reveal that d_F is a weighted quasi-metric defined on a manifold M . We also investigated the T -tensor of the Rander's change Matsumoto type (α, β) -metric.

REFERENCES

- [1] Ar Ajaykumar and Pradeep Kumar: *Reversible geodesics and T -tensor of a Finsler space with generalized (α, β) -metric*, Gulf J. Math., **14**(2023), No. 1, 125-138.
- [2] Ar Ajaykumar and Pradeep Kumar: *On the conformal transformation of Douglas space of second kind with Generalized (α, β) -metric*, Adv. Dyn. Syst. Appl., **17**(2022), No. 1, 299-310.
- [3] G. Hamel: *Über die geometrieen, in denen die geraden die kürzesten sind*, Math. Ann., **57**(1903), 231-264.
- [4] G. Shanker and S.A. Baby: *Reversible geodesics of Finsler spaces with a special (α, β) -metric*, Bull. Calcutta Math. Soc., **109**(2017), No. 3, 183-188.
- [5] H. Künzi and V. Vajner: *Weighted quasi-metrics*, Annals New York Academy Sci., **728**(1994), No. 1, 64-77.
- [6] I.M. Masca, V. Sabau and H. Shimada: *Two dimensional (α, β) -metrics with reversible geodesics*, Publ. Math. Debrecen, **82**(2013), No. 2, 485-501.
- [7] I.M. Masca, V. Sabau and H. Shimada: *Reversible geodesics for (α, β) -metrics*, Internat. J. Math., **21**(2010), No. 8, 1071-1094.
- [8] L.I. Pişcoran, A. Akram and C. Barbu: *On the reversible geodesics of a Finsler space endowed with a special deformed (α, β) -metric*, AUT J. Math. Comput., **2**(2021), No. 1, 73-80.
- [9] M. Crampin: *Randers spaces with reversible geodesics*, Publ. Math. Debrecen, **67**(2005), No. 3-4, 401-409.
- [10] M. Matsumoto: *On three dimensional Finsler spaces satisfying the t and b^p conditions*, Tensor (N.S.), **29**(1975), 13-20.
- [11] P. Kumar, T.S. Madhu and B.R. Sharath: *On Ricci tensors of a Finsler space with special (α, β) -metric*, J. Tensor Soc., **13**(2019), 73-80.
- [12] P. Kumar, T.S. Madhu and M. Ramesha: *Projective equivalence between two families of Finsler metrics*, Gulf J. Math., **4**(2016), No. 1, 65-74.
- [13] M. Rafeea, A. Kumara and G.C. Chaubey: *On the reversible geodesics of a Finsler space with special (α, β) -metric*, J. Math. Comput. Sci., **18**(2018), No. 3, 381-387.
- [14] S.G. Elgendi and L. Kozma: *(α, β) -metrics satisfying the t -condition or the σ_t -condition*, J. Geom. Anal., **31**(2021), No. 8, 7866-7884.

Received: January 31, 2024. *Revised:* June 05, 2024.

2020 Mathematics Subject Classification: 53B40, 53C60.

Key words and phrases: Finsler space, Rander's change Matsumoto type (α, β) -metric, reversible geodesic, T -tensor, Weighted quasi-metrics.

- [15] S.K. Narasimhamurthy and K. Chandru: *On curvatures of homogeneous Finsler-Kropina space*, Gulf J. Math., **5**(2017), No. 1, 73-83.
- [16] S.M. Vanithalakshmi and S.K. Narasimhamurthy: *S-curvature of homogeneous Finsler space with special (α, β) -metrics*, Gulf J. Math., **7**(2019), No. 1, 45-55.
- [17] S.V. Sabau and H. Shimada: *Finsler manifolds with reversible geodesics*, Rev. Roumaine Math. Pures Appl., **57**(2012), No. 1, 91-103.
- [18] S.S. Chern and Z. Shen: *Riemann-Finsler Geometry*, World Scientific, Singapore, 2005 (NTM 6).
- [19] Q. Xia: *Finsler metrics with reversible geodesics*, Bull. Korean Math. Soc., **57**(2020), No. 6, 1335-1349.
- [20] Z. Shen: *On projectively flat (α, β) -metric*, Canad. Math. Bull., **52**(2009), No. 1, 132-144.
- [21] Z. Shen: *Differential Geometry of Spray and Finsler Spaces*, Springer Science & Business Media, 2013.

L. D. College of Engineering, Ahmedabad
Faculty of Mathematics
Department of Science and Humanities
Navrangpura, Ahmedabad, Gujarat, 380015, India
E-mail address: brijeshkumartripathi4@gmail.com

Gujarat Technological University
Science Mathematics Branch
Chandkheda, Ahmedabad, Gujarat, 382424, India
E-mail address: sejalprajapati11198@gmail.com