CORRIGENDUM TO THE PAPER CS. VINCZE, ON GEOMETRIC VECTOR FIELDS OF MINKOWSKI SPACES AND THEIR APPLICATIONS

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Okada's theorem

$$0 = \frac{\partial F}{\partial y^i} - \frac{1}{F}\frac{\partial F}{\partial x^i} \;\Rightarrow\; F\frac{\partial F}{\partial y^i} = \frac{\partial F}{\partial x^i} \tag{1}$$

is a rule how to change derivatives with respect to x^i and y^i of a Funk metric. We have relatively simple formulas [1] for the canonical objects:

$$G^k = \frac{1}{2}y^k F, \quad G^k_i = \frac{\partial G^k}{\partial y^i} = \frac{F}{2}\delta^k_i + \frac{1}{2}y^k\frac{\partial F}{\partial y^i}, \tag{2}$$

$$X^h_i = \frac{\partial}{\partial x^i} - G^k_i\frac{\partial}{\partial y^k} = \frac{\partial}{\partial x^i} - \left(\frac{F}{2}\delta^k_i + \frac{1}{2}y^k\frac{\partial F}{\partial y^i}\right)\frac{\partial}{\partial y^k}. \tag{3}$$

The Funk metric is projectively equivalent to the affine space $\mathbb{R}^n$, i.e. any straight line $c(t) = p + tv$ can be reparameterized to the geodesics of the Funk metric. According to formula (2), the reparametrization is just the solution of the differential equation

$$\theta'' = -\theta' F(v_p); \tag{4}$$

see e.g. [2]. Under the initial conditions $\theta(0) = 0$ and $\theta'(0) = 1$, it follows that

$$\theta(t) = \frac{1 - \exp\left(-tF(v_p)\right)}{F(v_p)}, \quad \text{i.e.} \quad \tilde{c}(t) = p + \frac{1 - \exp\left(-tF(v_p)\right)}{F(v_p)}v \tag{5}$$

is a geodesic of the Funk metric. Equation (4) and its solution are the corrections of equation (21) and its solution in [3].

References

[1] D. Bao, S. - S. Chern and Z. Shen, *An Introduction to Riemann-Finsler geometry*, Springer-Verlag, 2000.

[2] J. Klein and A. Voutier, *Formes exterieures generatrices de sprays*, Ann. Inst. Fourier, Grenoble 18 (1) (1968), 241-260.

[3] Cs. Vincze, *On geometric vector fields of Minkowski spaces and their applications*, J. Diff. Geom. and Its Appl. 24 (2006), 1-20.

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