Corrigendum to "Vanishing S-curvature of Randers spaces" [Differential Geom. Appl. 29 (2011) 174–178]

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Abstract

We restate the main theorem of the paper [1]. We have only a necessary condition, which is sufficient to deduce the main observation of the paper.

In [1, Theorem 1.1], we state a necessary and sufficient condition for a Randers space to admit a measure whose **S**-curvature vanishes. We found that its proof contains an error and we have only a necessary condition as follows. We use the same notations as [1].

Theorem 1 *Let (M, F) be a Randers space written as $F(v) = \alpha(v) + \beta(v)$. If there is a measure m on M such that the associated* **S***-curvature is identically* 0*, then the function*

$$\Xi(v) = \frac{1}{F(v)} \sum_{i,j=1}^{n} (b_{i|j} + b_{j|i})(x) v^i v^j + \frac{2\alpha(v)}{F(v)} \sum_{i,j=1}^{n} (b_{i|j} - b_{j|i})(x) b^j(x) v^i \tag{1}$$

is linear in $v \in T_xM$ (for all x in the domain of the local coordinate system).

This is proven on page 177 of [1] (the following argument on page 178 is incorrect). We remark that this necessary condition is sufficient to achieve the main purpose of [1].

Remark 2 One can easily construct Randers spaces not satisfying the condition in Theorem 1. For example, if $b_1(x) = 0$ but $b_{1|1}(x) \neq 0$, then $v = (\partial/\partial x^1)|_x$ satisfies $F(v) = \alpha(v)$ and $\Xi(-v) \neq -\Xi(v)$ (since the first term in the right-hand side of (1) is not 0). Therefore, in general, a Finsler manifold does not necessarily possess a measure whose **S**-curvature vanishes identically.

We refer to a forthcoming book [2] for further discussions.

References

[1] S. Ohta, Vanishing S-curvature of Randers spaces. Differential Geom. Appl. **29** (2011), 174–178.

[2] S. Ohta, Comparison Finsler geometry. Book in preparation.

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