A Classification of Finsler connections and some applications
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Abstract

Vanishing hv-curvature of Berwald and Cartan connections characterize respectively, Berwaldian and Landsbergian structures among Finslerian structures. Discovery of Z. Shen connection whose hv-curvature characterizes the Riemannian structure, seems to completes their works. The importance of Shen connection become from the fact that it permits us to classify the Finsler connections in three different types. Using this property one can define naturally three general kind of Finsler connections with respect to their hv-curvatures.

In this paper, using this point of view we naturally define a General family of Finsler connections which contains the other Finsler connections as special cases. The hv-curvature of this connection characterize Berwald, Landsberg and Riemann structure among the Finsler structures (Theorems 1 to 4). The distinguished property of this connection is its adaptive form of the reduced hv-curvature $P$. In fact $P$ may be choose to be equal to any linear differential equation formed by Cartan tensor and its derivatives in a Finsler space. Using above theorems, one should find a geometric interpretations for the solutions of this kind of differential equations. As example for applications of this connection we have some results, specially when the flag curvature is constant (see theorems 5 to 9). Next we give a natural classification of some Finsler connections by mean of the General Finsler connection and by using the compatible tensors. This point of view gives a smart representation of Finsler connections. In the last part of this work we compare this connection with some of the Finsler connections (see Theorems 10 to 12).