

Connections on a Non-symmetric (Generalized) Riemannian Manifold

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We consider the connections on a non-symmetric Riemannian manifold $(M, G = g + F)$ with (skew-symmetric) torsion which satisfy the Einstein metricity condition

$$XG(Y, Z) - G(\nabla_Y X, Z) - G(Y, \nabla_X Z) = 0.$$

It is shown that an almost Hermitian manifold with torsion satisfies the Einstein metricity condition if and only if it is a nearly Kähler manifold.

In the case of an almost contact metric manifold with torsion we find possibly new class of almost contact metric manifolds which satisfy the Einstein metricity condition. Similar considerations lead to a definition of a particular class of almost para-Hermitian and almost paracontact metric manifolds.

References

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