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Four-dimensional neutral signature self-dual gradient Ricci solitons. (English) Zbl 1358.53045

Summary: We describe the local structure of self-dual gradient Ricci solitons in neutral signature. If the Ricci soliton is non-isotropic, then it is locally conformally flat and locally isometric to a warped product of the form $I \times \varphi N(c)$, where $N(c)$ is a space of constant curvature. If the Ricci soliton is isotropic, then it is locally isometric to the cotangent bundle of an affine surface equipped with the Riemannian extension of the connection, and the Ricci soliton is described by the underlying affine structure. This provides examples of self-dual gradient Ricci solitons that are not locally conformally flat.

MSC:

- 53C21 Methods of global Riemannian geometry, including PDE methods; curvature restrictions
- 53B30 Local differential geometry of Lorentz metrics, indefinite metrics
- 53C24 Rigidity results
- 53C44 Geometric evolution equations (mean curvature flow, Ricci flow, etc.) (MSC2010)

Keywords: gradient Ricci soliton; locally conformally flat; Walker manifold

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