Blair, D. E.; Ledger, A. J.
Critical associated metrics on contact manifolds. II. (English) Zbl 0611.53031

[Part I, cf. the first author, ibid. 37, 82-88 (1984; Zbl 0552.53014).]

Let $M$ be a compact contact manifold of dimension $2n + 1$ and $\mathcal{A}$ the set of metrics $g$ associated to the contact form $\eta$ so that $(\phi, \xi, \eta, g)$ is a contact metric structure [the first author, Contact manifolds in Riemannian geometry, Lect. Notes Math. 509 (1976; Zbl 0319.53026)]. In the present paper the integrals $I(g) = \int_M R dV$ and $K(g) = \int_M (R - R^* - 4n^2) dV$ are studied as functions on $\mathcal{A}$. Here $R$ is the scalar curvature and $R^*$ is the $*$-scalar curvature constructed from the curvature and $\phi$. The volume element is denoted by $dV$ as it does not depend on $g$ associated to $\eta$. The critical points of the functions $I(g)$ and $K(g)$ are found to be such that they satisfy certain commutativity conditions. In particular Sasakian metrics are maxima for $K(g)$ when they exist.

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MSC:

53C15 General geometric structures on manifolds (almost complex, almost product structures, etc.)
53C25 Special Riemannian manifolds (Einstein, Sasakian, etc.)
58E11 Critical metrics

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contact manifold; contact metric structure; scalar curvature; critical points; Sasakian metrics