YAMABE SOLITONS AND YAMABE ALMOST SOLITONS WITH VERTICAL POTENTIAL ON SOME SPECIAL TYPES OF ALMOST CONTACT COMPLEX RIEMANNIAN MANIFOLDS

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Abstract. *We summarize our results on Yamabe solitons and Yamabe almost solitons considered on almost contact complex Riemannian manifolds, known also as almost contact B-metric manifolds. These manifolds are endowed with a pair of mutually associated pseudo-Riemannian metrics with respect to the almost contact structure. Each of these metrics is specialized as a Yamabe (almost) soliton with a vertical potential, i.e. collinear to the Reeb vector field. The resulting manifolds are then investigated in three important cases with geometric significance. The first is when the manifold is cosymplectic, i.e. with parallel structure tensors. The second case is of such a manifold of Sasaki-like type, i.e. its complex cone is a holomorphic complex Riemannian manifold (also called a Kähler–Norden manifold). The third case is when the soliton potential is torse-forming, i.e. it satisfies a certain recurrence condition for its covariant derivative with respect to the Levi-Civita connection of the corresponding metric. The studied solitons are characterized. Explicit examples are commented, and the properties obtained in the theoretical part are confirmed.*

Key words: Yamabe soliton, Almost contact B-metric manifold, Almost contact complex Riemannian manifold, Sasaki-like manifold, Torse-forming vector field.

Mathematics Subject Classification: 53C25, 53D15, 53C50, 53C44, 53D35, 70G45.

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