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Infinitely many solutions for the prescribed Q -curvature problem in the null case

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Abstract

Given a compact Riemannian manifold (M, g) of even dimension, we provide sufficient conditions for the existence of infinitely many metrics within the conformal class of g that realize a prescribed Q -curvature.

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References

- [1] A. Ambrosetti, A. Malchiodi, *Nonlinear Analysis and Semilinear Elliptic Problems*, Cambridge Studies in Advanced Mathematics, Cambridge University Press, 2007, 157–176.
- [2] T. Aubin, *Some Nonlinear Problems in Riemannian Geometry*, Springer Berlin, Heidelberg, 1998, 145–250.
- [3] P. Baird, A. Fardoun, R. Regbaoui, *Q -curvature flow on 4-Manifolds*, Calc Var PDE **27** (2006), 75–104.
- [4] T.P. Branson, *Origins, applications and generalisations of the Q -curvature*, Acta Appl. Math. **102**, no. **2-3** (2008), 131–146.
- [5] S. Brendle, *Global existence and convergence for a higher order flow in conformal geometry*, Ann. Math. **158**(2) (2003), 323–343.
- [6] S.Y.A Chang, P.C. Yang, *Extremal metrics of zeta functional determinants on 4-manifolds*, Ann. of Math. **142**, (1995), 171–212.
- [7] Z. Djadli, A. Malchiodi, *A forther order uniformization theorem on some four manifolds with large total Q -curvature*, C. R. Math. Acad. Sci. Paris **340** (2005), 341–346.

- [8] Z. Djadli, A. Malchiodi, *Existence of conformal metrics with constant Q -curvature*, Ann. Math. **168**, No. 3 (Nov., 2008), 813–858.
- [9] Y. Ge, X. Xu, *Prescribed Q -curvature problem on closed 4-Riemannian manifolds in the null case*, Calc. Var. **31** (2008), 549–555.
- [10] A.R. Gover, *Laplacian operators and Q -curvature on conformally Einstein manifolds*, Math. Ann. **336**, (2006), 311–334.
- [11] C.R. Graham, R. Jenne, L.J. Mason, G.A.J. Sparling, *Conformally invariant powers of the Laplacian*, I. Existence. J. London Math. Soc. **46** (1992), 557–565.
- [12] M.E. Ounane, K. Tahri, *Multiplicity of solutions for an elliptic problem involving GJMS operator*, Filomat **38:5** (2024), 1547–1569.
- [13] K. Uhlenbeck, J. Viaclovsky, *Regularity of weak solutions to critical exponent variational equations*, Math. Res. Lett. **7-5/6** (2000), 651–656.