Constant Q-curvature metrics with Delaunay ends: The nondegenerate case

João Henrique Andrade, Rayssa Caju, João Marcos do Ó,
Jesse Ratzkin and Almir Silva Santos

Abstract. We construct a one-parameter family of solutions to the positive singular Q-curvature problem on compact nondegenerate manifolds of dimension bigger than four with finitely many punctures. If the dimension is at least eight we assume that the Weyl tensor vanishes to a sufficiently high order at the singular points. On a technical level, we use perturbation methods and gluing techniques based on the mapping properties of the linearized operator both in a small ball around each singular point and in its exterior. The main difficulties in our construction include controlling the convergence rate of the Paneitz operator to the flat bi-Laplacian in conformal normal coordinates and matching the Cauchy data of the interior and exterior solutions; the latter difficulty arises from the lack of geometric Jacobi fields in the kernel of the linearized operator. We overcome both these difficulties by constructing suitable auxiliary functions.