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*Zero and negative eigenvalues of conformally covariant operators, and nodal sets in conformal geometry*

We first describe conformal invariants that arise from nodal sets and negative eigenvalues of conformally covariant operators (such as Yamabe or Paneitz operator). We discuss applications to curvature prescription problems. We prove that the Yamabe operator can have an arbitrarily large number of negative eigenvalues on any manifold of dimension greater than 2. We show that 0 is generically not an eigenvalue of the conformal Laplacian. If time permits, we shall discuss related results on manifolds with boundary, as well as for weighted graphs. This is joint work with Y. Canzani, R. Gover, R. Ponge, A. Hassannezhad, M. Levitin, M. Karpukhin, G. Cox and Y. Sire.