

Generalizations of Pleijel's nodal domain theorem

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Courant's nodal domain theorem tells us that an eigenfunction associated with the k -th eigenvalue of the Laplacian has at most k nodal domains. Å. Pleijel showed in 1956 that for a given planar domain, eigenfunctions satisfying a Dirichlet boundary condition reach equality only for a finite number of k . The proof actually gives an asymptotic upper bound of the number of nodal domains. It was extended to manifolds, with the Dirichlet boundary condition, by B. Bérard and D. Meyer (1982), and to certain planar domains with the Neumann boundary condition by I. Polterovich (2009). We will establish the result for a family of Robin-type boundary conditions, including the Neumann one, in any sufficiently regular domain of \mathbb{R}^n , with $n \geq 2$.