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Boundary Control Method and Geometry of Inverse Problems

Gel'fand inverse spectral problem for manifolds consists of recovering the topology and geometry of a (compact) unknown Riemannian manifold from a set of spectral data of its Laplacian, e.g. its heat kernel inside a subdomain of the manifold or of its boundary. While the uniqueness for these problems is obtained by the boundary control method, the conditions for stability require proper geometric bounds which give rise to non-smooth manifolds in the spirit of the Gromov-Hausdorff convergence. We discuss two possible type of these conditions: those which do not allow for the collapse and those who can bring about the one-dimensional collapse.