
UPPER BOUNDS ON THE SECOND LAPLACIAN EIGENVALUE ON THE PROJECTIVE SPACE

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We investigate the isoperimetric inequality of the second eigenvalue on real projective space in all dimensions. It was shown in two dimensions by Nadirashvili and Penskoi that the second eigenvalue attains a maximum when a sequence eigenvalues approaches to that of a disjoint union of a sphere and a real projective space with a certain ratio. The conjecture is that the result in two dimensions can be generalized to all dimensions within the conformal class of the round metric. We prove an upper bound when the metric degenerates to that of two projective spaces.

We construct trial functions for variational characterization by using a generalized Veronese map to a higher dimensional spheres. We also discuss about a topological degree method and its another applications (joint work with R. Laugesen).