Applications of Riemannian Submersions to Spectral Geometry and Manifolds of Positive Sectional Curvature

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L01 Carson Hall, 2:00 pm
(Tea 3:10 pm Math Lounge)

Abstract

Spectral geometry is the study of the interplay between the geometry of a manifold and the spectrum of its Laplacian. Of key importance in this subject is the construction of examples of isospectral manifolds which are not isometric, as this is the only way of finding geometric properties which are not encoded in the spectrum. In the first part of this talk we will demonstrate how Riemannian submersions play an important role in constructing such examples. In particular, we will discuss my generalizations of Sunada's method and their consequences.

Another area in which Riemannian submersions appear is in the study of curvature. Curvature is one of the most basic geometric invariants. Although the study of manifolds of negative sectional curvature has enjoyed great success, our understanding of manifolds of positive sectional curvature lags far behind. In particular, there are very few known examples and there are few known obstructions to admitting a metric of positive sectional curvature. In the second part of this talk we will discuss the role Riemannian submersions play in constructing metrics of positive curvature and discuss a related question that I am currently thinking about.

This talk should be accessible to graduate students.

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