

GEOMETRIC ANALYSIS SEMINAR

Speaker: Shih-Kai Chiu
University of Notre Dame

Date: Thursday, April 18, 2019

Time: 11:00 AM

Location: 258 Hurley Hall



Lecture Title:

A Liouville type theorem for harmonic 1-forms

Abstract

The famous Cheng-Yau gradient estimate implies that on a complete Riemannian manifold with nonnegative Ricci curvature, any harmonic function that grows sublinearly must be a constant. This is the same as saying the function is closed as a 0-form. We prove an analog result for harmonic 1-forms. Namely, on a complete Ricci-flat manifold with Euclidean volume growth, any harmonic 1-form with sublinear growth must be closed. We prove this by proving an L^2 version of "gradient estimate" for 1-forms. As a corollary, we show that when the manifold is Ricci-flat Kähler with Euclidean volume growth, then any subquadratic harmonic function is pluriharmonic. This generalizes a result of Conlon-Hein.