Index Theory in Topology and Analysis: Two Histories

Erik van Erp
University of Hawaii

Monday, February 11, 2013
008 Kemeny, 4:00PM
Tea at 3:30 pm in 300 Kemeny

Abstract

I will talk about the history of index theory, and its roots in topology and analysis. On the one hand, there is the history that starts with the Riemann-Roch theorem and leads, via Hirzebruch's generalization, to the Atiyah-Singer index theorem. On the other hand there is an analytical tradition starting early in the 20th century with Fredholm's work on integral equations, and Fritz Noether's study of the Fredholm index of Toeplitz operators. It was the study of Fredholm index problems by analysts like Gelfand that inspired Atiyah and Singer to prove their general formula for elliptic operators. Boutet de Monvel's index theorem for Toeplitz operators related to pseudoconvex domains can be seen as a culmination of this second historical stream. At the end of the talk I will discuss recent results of P.Baum and myself, and where they fit in this historical perspective.

This talk should be accessible to graduate students.