THE WEIZMANN INSTITUTE OF SCIENCE
FACULTY OF MATHEMATICS AND COMPUTER SCIENCE

Seminar in Geometry and Topology

Room 261, Ziskind Building
on Tuesday, Apr 28, 2015
at 16:00

Marina Prokhorova
Russian Academy of Sciences

The index theorem for self-adjoint elliptic operators with local boundary conditions

Abstract:

The spectral flow is a well-known invariant of a 1-parameter family of self-adjoint Fredholm operators. It is defined as the net number of operator’s eigenvalues passing through 0 with the change of parameter.

Let $S$ be a compact surface with non-empty boundary. Consider the space $\text{Ell}(S)$ of first order self-adjoint elliptic differential operators on $S$ with local boundary conditions. The first part of the talk is devoted to the computing of the spectral flow along loops in $\text{Ell}(S)$, and also along paths with conjugated ends.

After that we consider more general situation: a family of elements of $\text{Ell}(S)$ parameterized by points of a compact space $X$. We define the topological index of such a family and show that it coincides with the analytical index of the family. Both indices take value in $K^1(X)$. When $X$ is a circle, this result turns into the formula for the spectral flow from the first part of the talk.