An Atiyah-Singer Topological Index for Proper Actions of Countable Discrete Groups

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Abstract

Let G be a countable discrete group. Let M be a smooth G-compact proper G-manifold. We define an Atiyah-Singer-type topological G-index for G-equivariant elliptic differential operators on M by equivariantly embedding M into a (possibly) infinite-dimensional Euclidean G-space. This embedding induces a map on the equivariant K-theory groups of the C^*-algebras associated to M and E, which is then composed with the equivariant Bott periodicity isomorphism of Higson-Kasparov-Trout. We will then show how to equate this topological index in the K-theory of the group C^*-algebra with the analytic G-index of Kasparov by using the equivariant E-theory of Guentner-Higson-Trout. We will also discuss extending this construction to proper actions of locally compact groups.