



Topology Seminar

2018, April 20, 11:00-11:50

Speaker: Dr. Sean Corrigan

Title: *Morse Numbers and Inequalities for Integral
Orbifold Borel Homology*

ABSTRACT

Since the classifying spaces for finite subgroups of orthogonal groups may be realized as direct limits of smooth manifolds, we can define a notion of "Morse function" on such a classifying space (or rather, on such a directed system of manifolds). Using this we can define, for any Morse function on a compact, orientable orbifold, a collection of "Morse numbers" (akin to the number of critical points of each index) which take into account the possibility that critical points may have nontrivial local group. These numbers satisfy Morse inequalities with respect to the associated Borel equivariant homology of the orbifold. In particular, they generalize to orbifolds the Morse inequalities for manifolds due to E. Pitcher (1957), addressing contributions from both the free and torsion subgroups of homology. The proof of these new Morse inequalities relies on a certain spectral sequence that arises from an orbifold Morse function and converges to Borel equivariant homology. Using singular knots, we'll see an example of two 3-dimensional orbifolds whose Borel equivariant homologies are isomorphic, but whose minimal Morse numbers are not the same.