EULER CHARACTERISTIC AND OBSTRUCTION THEORY

NATHANIEL ROUNDS STONY BROOK

I will describe three procedures for assigning a number to a manifold M: 1) putting a vector field on M and counting its zeros, 2) jiggling M a bit and then counting the number of times it intersects itself, and 3) computing the first obstruction to cross-sections of TM. By some miracle, these three procedures all give the same number, the Euler characteristic of M. In this elementary talk, I will define the first obstruction to sections of a bundle, show that this obstruction is a cohomology class, and then explain why the three procedures all give Euler characteristic. No knowledge of obstruction theory will be assumed.