

EULER CHARACTERISTIC AND OBSTRUCTION THEORY

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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.