

INTERSECTION HOMOLOGY

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ABSTRACT. It is the 1970s and recently there has been a lot of progress on the subject of characteristic classes on singular spaces. But there is a problem: The discovered classes all live in homology and thus cannot be multiplied like cohomology characteristic classes on manifolds can. To overcome that obstacle, Robert MacPherson and Mark Goresky work hard on defining a suitable geometric intersection product for these homology classes. Finally, they understand the need for stratifications of the singular spaces and some control over the deviation from transversality of cycles and strata. The name of the resulting homology theory was suggested to them by Dennis Sullivan: Intersection Homology.

Since then, various approaches to intersection homology have been discovered and intersection homology has found plenty of applications, especially in algebraic geometry. The aim of this mini course is to introduce three ways to describe intersection homology: Using singular chains, differential forms and sheaf theory. The lessons include calculations for several examples and an overview of the evolution of intersection homology.

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