18.157 — Spring 1997
Room 2-255, Tuesday – Thursday 9:30 - 11:00
Hodge Theory on Stratified Varieties

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February 3, 1997

Course description

In this course of lectures I intend to describe Hodge theory for Thom-Mather stratified varieties ("pseudomanifolds"). The main novelty will be the treatment of the generalized inverse of $d + \delta$, for appropriate degenerate metrics, and the corresponding Hodge decomposition. This leads to an identification of Hodge cohomology with L^2 cohomology ('Hodge theorem') and hence duality with intersection homology ('de Rham theorem'). I intend to approach the subject from the 'analytic' end and progress toward the topological.

Topics (as time permits)

1. Hodge decomposition for compact $\mathcal{C}^\infty$ manifolds.
2. Compact manifolds with boundary – relative and absolute homology.
3. Stratified spaces and pseudomanifolds.
4. Resolutions of pseudomanifolds and iterated fibrations.
5. Manifolds with conic, horn-like and cusp-like boundaries.
6. Admissible metrics.
7. Self-adjoint extensions of $d + \delta$, ideal boundary conditions.

8. Resolution of products and parametrices.
9. Hodge decomposition and L^2 cohomology.
10. Intersection homology and duality.
11. Kähler package.
12. Global invariants