

BOOK REVIEWS

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An introduction to intersection homology theory, by Frances Kirwan. Pitman Research Notes in Mathematics Series 187, Longman Scientific and Technical, Harlow, Essex, CM20 2JE, United Kingdom, 1988, vi + 169 pp., \$47.95. ISBN 0-582-02879-5 and ISBN 0-470-21198-9

1. INTRODUCTION

Intersection homology theory is a magnificent new tool for working with the common singular spaces, and it has engendered profound results in topology, analysis, arithmetic algebraic geometry, \mathcal{D} -module theory, and representation theory. When the spaces are smooth, the theory agrees with ordinary homology theory. However, when the spaces are singular, then it, unlike the ordinary theory, continues to satisfy Poincaré duality and the Künneth formula. Moreover, when the spaces are projective algebraic varieties in any characteristic, then it continues to exist, and it satisfies the two Lefschetz theorems as well. There is a corresponding L^2 -deRham–Hodge theory, and when the spaces are complex projective varieties, then there is a pure Hodge structure. During the fifteen years that have elapsed since its discovery, intersection homology theory has stimulated the frenetic efforts of an unprecedented and ever increasing number of mathematicians, including many of today's most gifted; they have done some of the most important mathematics of the century.

The book under review does not emphasize the historical development of intersection homology theory. The following sections