MANIFOLDS COVERED BY LINES, DEFECTIVE MANIFOLDS AND A RESTRICTED HARTSHORNE CONJECTURE

PALTIN IONESCU

Abstract. This is joint work with Francesco Russo. Embedded Fano manifolds with Picard group generated by the hyperplane section and of high index, are covered by lines and have small codimension. Besides complete intersections, examples are provided by dual defective manifolds and some special secant defective ones. Using the geometry of the variety of lines passing through a general point, we characterize scrolls among all dual defective manifolds. We give sharp bounds on the dual and secant defect, and relate the two types of defective manifolds. We discuss the Hartshorne Conjecture on complete intersections in the special case of Fano manifolds. When our manifold is also covered by lines, the conjecture is well reflected in the geometry of the variety of lines passing through the general point of X. In particular, the degrees of the equations scheme theoretically defining X become very relevant. For manifolds defined by quadratic equations the Hartshorne Conjecture is proved and the extremal cases are described completely.