

Beltrametti, Mauro C.; Sommese, Andrew J.

New properties of special varieties arising from adjunction theory. (English) Zbl 0754.14027
J. Math. Soc. Japan 43, No. 2, 381-412 (1991).

Fix a pair (X, L) with X an n -dimensional complex projective manifold and L a very ample line bundle on X . This paper (as well much research) is concerned with the geometry connected with the adjunction maps (say $\pi : X \rightarrow Y$) given by $|K_X + rL|$ and $|t(K + rL)|$. This paper gives strong informations in 3 critical cases: for $r = n - 2$ quadric bundles over surfaces and Del Pezzo fibrations over curves and for $n = 3, t = 2, 2r = 3$ fibrations over curves with $(\mathbb{P}^2, \mathcal{O}(2))$ as general fiber. A strong motivation came from projective geometry: e.g. the Del Pezzo part was applied elsewhere to the classification of 3-folds of degree 9 and 10 in \mathbb{P}^5 . A main result is that if Y is a normal surface, then Y has at most A_1 singularities and if $n \geq 4$, then π is equidimensional.

Later, large parts of the paper were generalized and the conjectures raised here partly solved [see e.g. *M. Beltrametti, A. J. Sommese* and *J. Wisniewski*: “Results on varieties with many lines and their applications to adjunction theory” in: Complex algebraic varieties, Proc. Conf., Bayreuth 1990, Lect. Notes Math. 1507, 33-38 (1992); *M. Andreatta, E. Ballico* and *J. Wisniewski*, *Int. J. Math.* 3, No. 3, 331-340 (1992) and *G. Besana*, “On the geometry of conic bundles arising in adjunction theory” Ph. D. thesis Notre Dame 1992].

In recent papers (by Mori theory) the interest was mainly in the case “ L ample”. An extremely strong tool for this case is the improved version of the proof of Kawamata’s base point free theorem given by *J. Kollár* [“Effective base point freeness” (preprint), see e.g. *M. Andreatta, E. Ballico* and *J. Wisniewski*, “Two theorems on elementary contractions”].

Reviewer: [E. Ballico \(Povo\)](#)

MSC:

- [14J60](#) Vector bundles on surfaces and higher-dimensional varieties, and their moduli
- [14C20](#) Divisors, linear systems, invertible sheaves
- [14M99](#) Special varieties
- [14D05](#) Structure of families (Picard-Lefschetz, monodromy, etc.)

Cited in **2** Reviews
Cited in **11** Documents

Keywords:

[Del Pezzo manifolds](#); [extremal ray](#); [very ample line bundle](#); [adjunction](#); [Mori theory](#)

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