MR3240995 14N20 14J60

Angelini, Elena [Angelini, Elena[2]] (I-FRNZ-MCS)

Logarithmic bundles of hypersurface arrangements in $\mathbf{P}^n$. (English summary)

Collect. Math. **65** (2014), *no. 3,* 285–302.

To an arrangement (i.e. a finite set) $\bigcup_i D_i$ of smooth projective hypersurfaces $D_i \subset \mathbf{P}^n$ with normal crossings, one associates, as Deligne did, the logarithmic bundle $\Omega_{\mathbf{P}^n}(\log(\bigcup_i D_i))$ of 1-forms with poles of order at most one along the D_i's. Since I. V. Dolgachev and M. M. Kapranov's paper [Duke Math. J. **71** (1993), no. 3, 633–664; MR1240599], a classical problem has been to recover the hypersurfaces D_i from the bundle $\Omega_{\mathbf{P}^n}(\log(\bigcup_i D_i))$. Dolgachev, Kapranov and then Vallès have solved the case of hyperplanes (see Theorem 3.3 in this paper) and Ueda and Yoshinaga the case of one smooth hypersurface (see Theorem 4.1 in this paper).

In this paper the author considers the same problem for many hypersurfaces. In particular, she proves that the arrangement is recoverable when all the hypersurfaces have the same degree d and $i \geq \binom{n+d}{d} + 3$, and she explains why it is not recoverable when $i = 1$ and $d = 2$ or when $i = 2$ and $d = 2$. *Jean Vallès*

References

1. Ancona, V.: Notes of a talk given in Florence (1998)
2. Ancona, V., Ottaviani, G.: Unstable hyperplanes for Steiner bundles and multidimensional matrices. Adv. Geom. **1,** 165–192 (2001) MR1840220
3. Angelini, E.: The Torelli problem for Logarithmic bundles of hypersurface arrangements in the projective space. Ph.D. thesis (2013)
4. Arnol'd, V.I.: The cohomology ring of the colored braid group. Math. Notes **5,** 138–140 (1969) MR0242196
5. Barth, W.: Moduli of vector bundles on the projective plane. Invent. Math. **42,** 63–91 (1977) MR0460330
6. Bohnhorst, G., Spindler, H.: The stability of certain vector bundles on $\mathbf{P}^n$. In: Complex algebraic varieties. Lecture Notes in Mathematics, vol. 1507, pp. 39–50 (1992) MR1178718
7. Catanese, F., Hosten, S., Khetan, A., Sturmfels, B.: The maximum likelihood degree. Am. J. Math. **128**(3), 671–697 (2006) MR2230921
8. Deligne, P.: Équations différentielles à points singuliers réguliers. Lecture Notes in Mathematics, vol. 163. Springer, Berlin (1970) MR0417174
9. Deligne, P.: Théorie de Hodge: II. Publications mathématiques de l'I.H.É.S., tome **40,** 5–57 (1971) MR0498551
10. Dolgachev, I.: Logarithmic sheaves attached to arrangements of hyperplanes. J. Math. Kyoto Univ. **47**(1), 35–64 (2007) MR2359100
11. Dolgachev, I., Kapranov, M.M.: Arrangements of hyperplanes and vector bundles on $\mathbf{P}^n$. Duke Math. J. **71**(3), 633–664 (1993) MR1240599
12. Faenzi, D., Matei, D., Vallès, J.: Hyperplane arrangements of Torelli type. Composit. Math. **149**(02), 309–332 (2013) MR3020311
13. Harris, J.: Algebraic Geometry: A First Course. Graduate Texts in Mathematics. Springer, New York (1992) MR1182558
14. Hosten, S., Khetan, A., Sturmfels, B.: Solving the likelihood equations. Found.

Comput. Math. **5,** 389–407 (2005) MR2189544
15. Hulek, K.: Stable rank-2 vector bundles on $\mathbf{P}_2$ with c_1 odd. Math. Ann. **242,** 241–266 (1979) MR0545217
16. Okonek, C., Schneider, M., Spindler, H.: Vector Bundles on Complex Projective Spaces. Birkhäuser, Stuttgart (1980) MR0561910
17. Orlik, P., Terao, H.: Arrangements of Hyperplanes. Grundlehren der Mathematischen Wissenschaften [Fundamental Principles of Mathematical Sciences], vol. 300. Springer, Berlin (1992) MR1217488
18. Ottaviani, G.: Introduction to the hyperdeterminant and to the rank of multidimensional matrices. In: Peeva I. (Ed.) Commutative algebra. Expository Papers Dedicated to David Eisenbud on the occasion of his 65th Birthday, VIII (2013). arXiv e-prints 1301.0472v1 [math.AG], to appear MR2976691
19. Saito, K.: Theory of logarithmic differential forms and logarithmic vector fields. J. Fac. Sci. Univ. Tokyo Sect. IA Math. **27**(2), 265–291 (1980) MR0586450
20. Schenck, H.K.: Elementary modifications and line configurations in $\mathbf{P}^2$. Comment. Math. Helv. **78**(3), 447–462 (2003) MR1998388
21. Schwarzenberger, R.L.E.: The secant bundle of a projective variety. Proc. Lond. Math. Soc. **14,** 369–384 (1964) MR0159826
22. Schwarzenberger, R.L.E.: Vector bundles on the projective plane. Lond. Math. Soc. **11,** 623–640 (1961) MR0137712
23. Ueda, K., Yoshinaga, M.: Logarithmic vector fields along smooth plane cubic curves. Kumamoto J. Math. **21,** 11–20 (2008) MR2418680
24. Ueda, K., Yoshinaga, M.: Logarithmic vector fields along smooth divisors in projective spaces. Hokkaido Math. J. **38**(3), 409–415 (2009) MR2548229
25. Vallès, J.: Nombre maximal d'hyperplanes instables pour un fibré de Steiner. Math. Zeit. **233,** 507–514 (2000) MR1750934

Note: This list reflects references listed in the original paper as accurately as possible with no attempt to correct errors.