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

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Let $\mathcal{D} = \{D_1, \dots, D_l\}$ be an arrangement of distinct smooth irreducible hypersurfaces of degree $d_1, \dots, d_l$ in $\mathbb{P}^n$ such that the divisor $D = D_1 + \cdots + D_l$ has only normal crossings. Associated to such an arrangement, one can consider the sheaf $\Omega^1_{\mathbb{P}^n}(\log \mathcal{D})$ of differential 1-forms with logarithmic poles along D. An arrangement $\mathcal{D}$ is called a Torelli arrangement if the isomorphic class of $\Omega^1_{\mathbb{P}^n}(\log \mathcal{D})$ determines $\mathcal{D}$. Assuming all hypersurfaces have the same degree, the author has investigated when the arrangement $\mathcal{D}$ is Torelli in [Collect. Math. **65** (2014), no. 3, 285–302; MR3240995]. This problem is known as the Torelli problem for arrangements. In this paper, the author investigates the problem for multi-degree arrangements. She shows that under certain conditions the multi-degree arrangement $\mathcal{D}$ with sufficiently large l can be recovered from $\Omega^1_{\mathbb{P}^n}(\log \mathcal{D})$. She also investigates conic-line arrangements with a small number of components. Along with other results on conic-line arrangements, the author shows that an arrangement of one line and one conic, or of two lines and a conic, is not Torelli. *Fei Ye*

References

1. V. Ancona, G. Ottaviani, *Unstable hyperplanes for Steiner bundles and multidimensional matrices*, Advances in Geometry, 1 (2001), 165–192 MR1840220
2. E. Angelini, *Logarithmic bundles of hypersurface arrangements in* $\mathbf{P}^n$, Collectanea Mathematica, Volume 65, Issue 3, (2014), 285–302 MR3240995
3. E. Angelini, *The Torelli problem for Logarithmic bundles of hypersurface arrangements in the projective space*, Ph.D. thesis (2013), available on the author's web page (http://web.math.unifi.it/users/angelini/finalphdthesis.pdf) MR3240995
4. E. Ballico, S. Huh, F. Malaspina, *A Torelli type problem for logarithmic bundles over projective varieties* (2013), arXiv: 1309.7192v2 [math.AG] MR3356830
5. G. Bohnhorst, H. Spindler, *The stability of certain vector bundles on* $\mathbf{P}^n$, Complex algebraic varieties, Lect. Notes Math., vol. 1507, 39–50 (1992) MR1178718
6. D. Cox, J. Little, D. O'Shea, *Using Algebraic Geometry*, Graduate Texts in Mathematics, Springer-Verlag New York (1998) MR1639811
7. P. Deligne, *Théorie de Hodge: II*, Publications mathématiques de l'I.H.É.S., tome 40 (1971), 5–57 MR0498551
8. P. Deligne, *Équations différentielles à points singuliers réguliers*, Lecture Notes in Mathematics, Vol. 163, Springer-Verlag, Berlin (1970) MR0417174
9. A. Dimca, E. Sernesi, *Syzygies and logarithmic vector fileds along plane curves*, arXiv: 1401.6838v1 [math.AG] MR3322789
10. I. Dolgachev, *Logarithmic sheaves attached to arrangements of hyperplanes*, J. Math. Kyoto Univ. 47 (2007), n. 1, 35–64 MR2359100
11. I. Dolgachev, M. M. Kapranov, *Arrangements of hyperplanes and vector bundles on* $\mathbf{P}^n$, Duke Math. J. 71 (1993), n. 3, 633–664 MR1240599
12. F. Enriques, O. Chisini, *Lezioni sulla teoria geometrica delle equazioni e delle funzioni algebriche*, vol. 2, Zanichelli (1985) MR0966665
13. D. Faenzi, D. Matei, J. Vallès, *Hyperplane arrangements of Torelli type*, Compositio

Math., Volume 149, Issue 02, (2013), 309–332 MR3020311
14. J. Harris, *Algebraic Geometry: a first course*, Graduate Texts in Mathematics, Springer-Verlag New York (1992) MR1182558
15. R. Morris, *SingSurf - Interactive Geometry*, avalaible at http://www.singsurf.org/
16. D. Mumford, *The Red Book of Varieties and Schemes*, 2^{nd} edition, Springer-Verlag (1999) MR1748380
17. C. Okonek, M. Schneider, H. Spindler, *Vector Bundles on Complex Projective Spaces*, Birkhauser (1980) MR0561910
18. G. Ottaviaini, *Varietà proiettive di codimensione piccola*, Istituto Nazionale di Alta Matematica "Francesco Severi", Aracne editrice (1995)
19. K. Saito, *Theory of logarithmic differential forms and logarithmic vector fields*, J. Fac. Sci. Univ. Tokyo Sect. IA Math. 27 (1980), n. 2, 265–291 MR0586450
20. H. K. Schenck, *Elementary modifications and line configurations in* $\mathbf{P}^2$, Comment. Math. Helv. 78 (2003), n. 3, 447–462 MR1998388
21. R. L. E. Schwarzenberger, *The secant bundle of a projective variety*, Proc. London Math. Soc. 14 (1964), 369–384. MR0159826
22. R. L. E. Schwarzenberger, *Vector bundles on the projective plane*, London Math. Soc. 11 (1961), 623–640. MR0137712
23. B. Sturmfels, *Solving Systems of Polynomial Equations*, Conference Board of the Mathematical Science, n. 97, AMS (2002). MR1925796
24. K. Ueda, M. Yoshinaga, *Logarithmic vector fields along smooth divisors in projective spaces*, Hokkaido Math. Journal, vol. 38, no. 3, 409–415 (2009) MR2548229
25. K. Ueda, M. Yoshinaga, *Logarithmic vector fields along smooth plane cubic curves*, Kumamoto Journal of Mathematics, vol. 21, 11–20 (2008) MR2418680
26. J. Vallès, *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.