



HOKKAIDO UNIVERSITY

Title	A hierarchy of general positions for hyperplane arrangements, and their varieties [an abstract of dissertation and a summary of dissertation review]
Author(s)	齋藤, 琢弥
Degree Grantor	北海道大学
Degree Name	博士(理学)
Dissertation Number	甲第16239号
Issue Date	2025-03-25
Doc URL	https://hdl.handle.net/2115/95360
Rights(URL)	https://creativecommons.org/licenses/by/4.0/
Type	doctoral thesis
File Information	Takuya_Saito_review.pdf, 審査の要旨



学 位 論 文 審 査 の 要 旨

博士の専攻分野の名称 博士 (理学) 氏 名 齋藤 琢弥

	主 査	特任教授	齋藤 睦
審査担当者	副 査	教 授	秋田 利之
	副 査	准教授	Simona Settepanella (トリノ大学)
	副 査	教 授	Mario Salvetti (ピサ大学)

学位論文題名

A hierarchy of general positions for hyperplane arrangements, and their varieties
(超平面配置の一般の位置の程度, 及びその多様体)

博士学位論文審査等の結果について (報告)

In this Doctoral Dissertation, the author has shown several important results on discriminantal arrangements.

A discriminantal arrangement $B(A)$ of an arrangement A was introduced by Manin and Schechtman as a generalized braid arrangement. The combinatorial structure of discriminantal arrangements may not remain constant even for original arrangements having the same combinatorics. Hence one of the main problems in the theory of discriminantal arrangements is describing stratification of the space of arrangements according to combinatorics of their discriminantal arrangements. Let $\text{Arr}(E, k)$ denote the set of arrangements indexed by a finite set E in a k -dimensional vector space. Arrangements on a Zariski open set of $\text{Arr}(E, k)$ yield discriminantal arrangements with constant combinatorics, called very generic, while the other generic arrangements are called non-very generic.

Let A be a generic arrangement. To an intersection X of $B(A)$, by the components of X , a set $T(X)$ of subsets of E is associated. The author defines $Q(E, k)$ consisting of those sets of subsets of E with the properties $T(X)$'s satisfy. Then, for T in $Q(E, k)$ and an integer r , he introduces the (T, r) -singularity variety in $\text{Arr}(E, k)$, and has shown that the set of non-very generic arrangements is the union of (T, r) -singularity varieties. He also describes how the discriminantal arrangement varies by the deletion, restriction, or degeneration. The degeneration is a powerful tool for finding non-very generic arrangements. He also gives an inequality about the codimension of (T, r) -singularity varieties, and sufficient conditions for them to be hypersurfaces in the space of hyperplane arrangements. He gives a complete description of stratification on $\text{Arr}(6, 3)$ and new interesting examples: non-very generic line arrangements such as generalized Crago configurations.

His above results are very fundamental and important, and a great contribution to the theory of discriminantal arrangements. Therefore, we acknowledge that the author is qualified to be granted a Doctorate of Philosophy from Hokkaido University.