Contents

1 Introduction **1**
- 1.1 History . . . 1
- 1.2 The Classical Example . . . 4
- 1.3 Outline . . . 6

Part I **16**

2 Hypergeometric Integrals **17**
- 2.1 Local System Cohomology . . . 17
- 2.2 Homology with Local Coefficients . . . 19
- 2.3 Hypergeometric Pairing . . . 20

3 Arrangements **23**
- 3.1 Basic Constructions . . . 23
- 3.2 Dense Edges . . . 25
- 3.3 The β Invariant . . . 27

4 Non-Resonance Theorems **31**
- 4.1 Logarithmic Complex . . . 31
- 4.2 The Arrangement Case . . . 34

5 Combinatorics **39**
- 5.1 The Orlik-Solomon Algebra . . . 39
- 5.2 The NBC Complex . . . 40
- 5.3 The β**nbc** Set . . . 45

6 Bases **47**
- 6.1 The Aomoto Complex . . . 47
- 6.2 The Isomorphism . . . 48
- 6.3 The β**nbc** Cohomology Basis . . . 53
- 6.4 The β**nbc** Homology Basis . . . 54
- 6.5 Resonance . . . 56

7 The Determinant of a Period Matrix **59**
7.1 The Period Matrix 59
7.2 The Main Theorem 60
7.3 Deletion-Restriction Formulas 62
7.4 Proof of the Main Theorem 65

Part II **67**

8 Families of 1-Arrangements **69**
8.1 Pure Braid Space 69
8.2 Gauss-Manin Connection 70
8.3 Infinitesimal Braid Relations 73
8.4 Fundamental Group Action 74

9 Moduli Spaces **79**
9.1 Combinatorially Equivalent Arrangements 79
9.2 Realizable Arrangements 82
9.3 Codimension ≤ 1 84

10 Gauss-Manin Connections **89**
10.1 Fibration 89
10.2 General Formulas 92
10.3 Codimension Zero 94
10.4 Codimension One 97

Bibliography **103**