

TABLE OF CONTENTS

PART I

Preface Part I . . . . . 2

CONFERENCE AT KATATA

Hikosaburo KOMATSU: An introduction to the theory of hyper-  
functions. . . . . 3

Mitsuo MORIMOTO: Edge of the wedge theorem and hyperfunction . . 41

Jean-Michel BONY et Pierre SCHAPIRA: Solutions hyperfonctions  
du problème de Cauchy. . . . . 82

Takahiro KAWAI: On the global existence of real analytic  
solutions of linear differential equations . . . . . 99

Akira KANEKO: Fundamental principle and extension of solutions  
of linear differential equations with constant coefficients 122

CONFERENCE AT RIMS

Sunao ŌUCHI: On abstract Cauchy problems in the sense of hyper-  
functions. . . . . 135

Shinichi KOTANI and Yasunori OKABE: On a Markovian property of  
stationary Gaussian processes with a multi-dimensional  
parameter. . . . . 153

Hikosaburo KOMATSU: Ultradistributions and hyperfunctions. . . . 164

APPENDICES

Hikosaburo KOMATSU: Hyperfunctions and linear partial differen-  
tial equations . . . . . 180

Hikosaburo KOMATSU: Relative cohomology of sheaves of solutions  
of differential equations. . . . . 192

PART II

Preface Part II. . . . . 264

Mikio SATO, Takahiro KAWAI and Masaki KASHIWARA:  
Microfunctions and Pseudo-differential Equations

CHAPTER I. Theory of Microfunctions. . . . . 265

1. Construction of the sheaf of microfunctions. . . . .	265
1.1. Hyperfunctions. . . . .	265
1.2. Real monoidal transformation and real comonoidal transformation. . . . .	266
1.3. Definition of microfunctions. . . . .	273
1.4. Sheaves on sphere bundle and on cosphere bundle . . . .	277
1.5. Fundamental diagram on $\mathcal{C}$ . . . . .	282
2. Several operations on hyperfunctions and microfunctions. . .	286
2.1. Linear differential operators . . . . .	286
2.2. Substitution. . . . .	287
2.3. Integration along fibers. . . . .	294
2.4. Products. . . . .	296
2.5. Micro-local operators . . . . .	299
2.6. Complex conjugation . . . . .	302
3. Techniques for construction of hyperfunctions and micro- functions. . . . .	302
3.1. Real analytic functions of positive type. . . . .	303
3.2. Boundary values of hyperfunctions with holomorphic para- meters and examples . . . . .	307
CHAPTER II. Foundation of the Theory of Pseudo-differential Equations. . . . .	315
1. Definition of pseudo-differential operators. . . . .	315
1.1. Definition of pseudo-differential operators . . . . .	315
1.2. Operations on holomorphic microfunctions. . . . .	324
1.3. Sheaf of pseudo-differential operators. . . . .	329
1.4. Concrete expression of holomorphic microfunctions . . .	332
1.5. Adjoints, composites and coordinate transformations . .	344
2. Fundamental properties of pseudo-differential operators. . .	356
2.1. Theorems on ellipticity and the equivalence of pseudo-differential operators . . . . .	356
2.2. Theorems on division of pseudo-differential operators .	365
3. Algebraic properties of the sheaf of pseudo-differential operators. . . . .	384
3.1. Pseudo-differential operators with holomorphic para- meters. . . . .	384
3.2. Properties of the Ring of formal pseudo-differential operators . . . . .	385
3.3. Contact structure and quantized contact transforms. . .	391
3.4. Faithful flatness . . . . .	400
3.5. Operations on systems of pseudo-differential equations.	406

4. Maximally overdetermined systems . . . . .	419
4.1. Definition of maximally overdetermined systems. . . . .	419
4.2. Invariants of maximally overdetermined systems. . . . .	419
4.3. Quantized contact transforms - general case - . . . . .	427
5. Structure theorem for systems of pseudo-differential equations in the complex domain. . . . .	429
5.1. Structure theorem for systems of pseudo-differential equations with simple characteristics . . . . .	429
5.2. Equivalence of pseudo-differential operators with constant multiple characteristics . . . . .	434
5.3. Structure theorem for regular systems of pseudo- differential equations. . . . .	448
CHAPTER III. Structure of Systems of Pseudo-differential Equations. . . . .	457
1. Realification of holomorphic microfunctions. . . . .	457
1.1. Realification of holomorphic hyperfunctions . . . . .	457
1.2. Realification of holomorphic microfunctions . . . . .	462
1.3. Real "quantized" contact transforms . . . . .	467
2. Structure theorems for systems of pseudo-differential equations in the real domain . . . . .	469
2.1. Structure theorem I - partial de Rham type -. . . . .	470
2.2. Structure theorem II - partial Cauchy Riemann type -. .	479
2.3. Structure theorem III - Lewy-Mizohata type -. . . . .	496
2.4. Structure theorem IV - general case - . . . . .	520
Bibliographie. . . . .	524