

## **Contents**

Organization of the Congress .....	xiv
Opening Ceremonies .....	xv
Closing Ceremonies .....	xviii
Invited Speakers .....	xx
Members of the Congress .....	xxii
Membership by Countries .....	1

### **Fields Medalists**

The Work of Enrico Bombieri .....	3
K. CHANDRASEKHARAN	
The Work of David Mumford .....	11
J. TATE	

### **Expository Addresses**

Critical Points of Smooth Functions .....	19
V. I. ARNOLD	
Aspects of Modern Potential Theory .....	41
HEINZ BAUER	
Variational Problems and Elliptic Equations .....	53
ENRICO BOMBIERI	
Four Aspects of the Mathematical Theory of Economic Equilibrium .....	65
GERARD DEBREU	
Poids dans la Cohomologie des Variétés Algébriques .....	79
PIERRE DELIGNE	
Mathematical Problems of Tidal Energy .....	87
G. F. D. DUFF	
Recent Progress in Classical Fourier Analysis .....	95
CHARLES FEFFERMAN	
Analysis over Infinite-Dimensional Spaces and Applications to Quantum Field Theory .....	119
JAMES GLIMM	

Initial Boundary Value Problems for Hyperbolic Partial Differential Equations .....	127
HEINZ-OTTO KREISS	
Sur la Théorie du Contrôle .....	139
J. L. LIONS	
Transversal Theory .....	155
E. C. MILNER	
Higher Algebraic $K$ -Theory .....	171
DANIEL QUILLLEN	
Applications of Thue's Method in Various Branches of Number Theory .....	177
WOLFGANG M. SCHMIDT	
Eigenvalues of the Laplacian and Invariants of Manifolds .....	187
I. M. SINGER	
Inside and Outside Manifolds .....	201
D. SULLIVAN	
On Buildings and their Applications .....	209
J. TITS	
Coding of Signals with Finite Spectrum and Sound Recording Problems .....	221
A. G. VITUSHKIN	
 Section 1—Mathematical Logic and the Foundations of Mathematics	
Admissible Sets and the Interaction of Model Theory, Recursion Theory and Set Theory .....	229
K. JON BARWISE	
Some Systems of Second Order Arithmetic and Their Use .....	235
HARVEY FRIEDMAN	
On Superintuitionistic Logics .....	243
A. V. KUZNETSOV	
New Methods and Results in Descriptive Set Theory .....	251
YIANNIS N. MOSCHOVAKIS	
Why There Are Many Nonisomorphic Models for Unsuperstable Theories ..	259
SAHARON SHELAH	
On the Singular Cardinals Problem .....	265
JACK SILVER	
A General Framework for Simple $\Delta_2^0$ and $\Sigma_1^0$ Priority Arguments .....	269
C. E. M. YATES	

## Section 2—Algebra

Algebraic $K$ -Theory: A Historical Survey .....	277
HYMAN BASS	
Some Category-Theoretic Ideas in Algebra (A Too-Brief Tour of Algebraic Structure, Monads, and the Adjoint Tower) .....	285
GEORGE M. BERGMAN	

Orthodox Semigroups Which are Unions of Groups .....	297
A. H. CLIFFORD	
A Survey of Some Results on Free Resolutions .....	303
DAVID EISENBUD	
<i>K</i> -Theory and Algebraic Cycles .....	309
S. M. GERSTEN	
Varieties of Algebras and Their Congruence Varieties .....	315
BJARNI JÓNSSON	
О Разрешимых Подгруппах Конечных Простых Групп .....	321
В. Д. МАЗУРОВ	
Quadratic Methods in Nonassociative Algebras .....	325
KEVIN McCrimmon	
On Subspaces of Inner Product Spaces .....	331
WINFRIED SCHARLAU	
Something Like the Brauer Group.....	337
MOSS EISENBERG SWEEDLER	
Некоторые Вопросы Бирациональной Геометрии Алгебраических Торов .....	343
Б. Е. ВОСКРЕСЕНСКИЙ	

### Section 3—Number Theory

Galois Module Structure and Artin <i>L</i> -Functions .....	351
A. FRÖHLICH	
The Distribution of Sequences in Arithmetic Progressions .....	357
C. HOOLEY	
Тригонометрические Суммы и их Применения .....	365
А. А. КАРАЦУБА	
<i>p</i> -Adic Analytic Number Theory of Elliptic Curves and Abelian Varieties over $\mathbb{Q}$ .....	369
B. MAZUR	
Distribution of the Zeros of the Riemann Zeta Function .....	379
HUGH L. MONTGOMERY	
Элементарный Метод в Теории Уравнений над Конечными Полями .....	383
С. А. СТЕПАНОВ	

### Section 4—Algebraic Geometry

Le Groupe de Monodromie du Déploiement des Singularités Isolées du Courbes Planes. II .....	395
NORBERT A'CAMPO	
Theory of Intersections on the Arithmetic Surface .....	405
S. J. ARAKELOV	
Submanifolds of Low Codimension in Projective Space .....	409
WOLF BARTH	
Applications of the Theory of Prym Varieties .....	415
C. H. CLEMENS	

New Surfaces with No Meromorphic Functions .....	423
MASAHISA INOUE	
Algebro-Geometrical Equisingularity and Local Topological Classification of Smooth Mappings .....	427
A. N. VARCHENKO	
<b>Section 5—Algebraic Groups and Discrete Subgroups</b>	
Cohomology of Arithmetic Groups .....	435
ARMAND BOREL	
Singularitäten von Modulmannigfaltigkeiten und Körper Automorpher Funtionen .....	443
EBERHARD FREITAG	
On the Cohomology of Discrete Subgroups of $p$ -Adic Groups.....	449
HOWARD GARLAND	
Representations of $p$ -Adic Division Algebras: An Example of the Change of Base Problem in Representation Theory of Algebraic Groups .....	455
ROGER HOWE	
Euler Products and Automorphic Forms .....	459
HERVE JACQUET	
On the Discrete Series Representations of the Classical Groups over Finite Fields .....	465
G. LUSZTIG	
Арифметические и Структурные Проблемы в Линейных Алгебраических Группах.....	471
Б. П. ПЛАТОНОВ	
<b>Section 6—Geometry</b>	
Some Open Questions on Convex Surfaces .....	479
WILLIAM J. FIREY	
Convex Polyhedra and Mathematical Programming.....	485
VICTOR KLEE	
Metrical and Combinatorial Properties of Convex Polytopes .....	491
P. McMULLEN	
Probabilistic and Combinatorial Methods in the Study of the Geometry of Euclidean Spaces .....	497
C. A. ROGERS	
Геометрия Положительных Квадратичных Форм.....	501
С. С. Рышков	
<b>Section 7—Algebraic and Differential Topology</b>	
Topological Classification of Simple Homotopy Equivalences .....	509
T. A. CHAPMAN	

Multidimensional Plateau Problem on Riemannian Manifolds. On the Problem of the Algorithmical Recognizability of the Standard Three-Dimensional Sphere .....	515
A. T. FOMENKO	
Global and Local Characteristic Class Theory in Topological Transformation Groups .....	525
WU-YI HSIANG	
The Structure of the Oriented Topological and Piecewise Linear Bordism Rings .....	533
R. JAMES MILGRAM	
Equivariant Quasi-Equivalence, Transversality and Normal Cobordism .....	537
TED PETRIE	
Compact Leaves of Foliations .....	543
PAUL A. SCHWEITZER, S. J.	
On the Construction and Classification of Foliations .....	547
WILLIAM THURSTON	
Index .....	551