

Cambridge University Press
 978-0-521-46631-8 - Singularities: Lille 1991
 Edited by Jean-Paul Brasselet
 Frontmatter
[More information](#)

LONDON MATHEMATICAL SOCIETY LECTURE NOTE SERIES

Managing Editor: Professor J.W.S. Cassels, Department of Pure Mathematics and Mathematical Statistics,
 University of Cambridge, 16 Mill Lane, Cambridge CB2 1SB, England

The titles below are available from booksellers, or, in case of difficulty, from Cambridge University Press.

- 34 Representation theory of Lie groups, M.F. ATYAH *et al*
- 36 Homological group theory, C.T.C. WALL (ed)
- 39 Affine sets and affine groups, D.G. NORTHCOTT
- 46 p-adic analysis: a short course on recent work, N. KOBLITZ
- 50 Commutator calculus and groups of homotopy classes, H.J. BAUES
- 59 Applicable differential geometry, M. CRAMPIN & F.A.E. PIRANI
- 66 Several complex variables and complex manifolds II, M.J. FIELD
- 69 Representation theory, I.M. GELFAND *et al*
- 74 Symmetric designs: an algebraic approach, E.S. LANDER
- 76 Spectral theory of linear differential operators and comparison algebras, H.O. CORDES
- 77 Isolated singular points on complete intersections, E.J.N. LOOIJENGA
- 79 Probability, statistics and analysis, J.F.C. KINGMAN & G.E.H. REUTER (eds)
- 83 Homogeneous structures on Riemannian manifolds, F. TRICERRI & L. VANHECKE
- 86 Topological topics, I.M. JAMES (ed)
- 87 Surveys in set theory, A.R.D. MATHIAS (ed)
- 88 FPF ring theory, C. FAITH & S. PAGE
- 89 An F-space sampler, N.J. KALTON, N.T. PECK & J.W. ROBERTS
- 90 Polytopes and symmetry, S.A. ROBERTSON
- 91 Classgroups of group rings, M.J. TAYLOR
- 92 Representation of rings over skew fields, A.H. SCHOFIELD
- 93 Aspects of topology, I.M. JAMES & E.H. KRONHEIMER (eds)
- 94 Representations of general linear groups, G.D. JAMES
- 95 Low-dimensional topology 1982, R.A. FENN (ed)
- 96 Diophantine equations over function fields, R.C. MASON
- 97 Varieties of constructive mathematics, D.S. BRIDGES & F. RICHMAN
- 98 Localization in Noetherian rings, A.V. JATEGAONKAR
- 99 Methods of differential geometry in algebraic topology, M. KAROUBI & C. LERUSTE
- 100 Stopping time techniques for analysts and probabilists, L. EGGHE
- 101 Groups and geometry, ROGER C. LYNDON
- 103 Surveys in combinatorics 1985, I. ANDERSON (ed)
- 104 Elliptic structures on 3-manifolds, C.B. THOMAS
- 105 A local spectral theory for closed operators, I. ERDELYI & WANG SHENGWANG
- 106 Syzygies, E.G. EVANS & P. GRIFFITH
- 107 Compactification of Siegel moduli schemes, C-L. CHAI
- 108 Some topics in graph theory, H.P. YAP
- 109 Diophantine analysis, J. LOXTON & A. VAN DER POORTEN (eds)
- 110 An introduction to surreal numbers, H. GONSHOR
- 113 Lectures on the asymptotic theory of ideals, D. REES
- 114 Lectures on Bochner-Riesz means, K.M. DAVIS & Y-C. CHANG
- 115 An introduction to independence for analysts, H.G. DALES & W.H. WOODIN
- 116 Representations of algebras, P.J. WEBB (ed)
- 117 Homotopy theory, E. REES & J.D.S. JONES (eds)
- 118 Skew linear groups, M. SHIRVANI & B. WEHRFRITZ
- 119 Triangulated categories in the representation theory of finite-dimensional algebras, D. HAPPEL
- 121 Proceedings of *Groups - St Andrews 1985*, E. ROBERTSON & C. CAMPBELL (eds)
- 122 Non-classical continuum mechanics, R.J. KNOPS & A.A. LACEY (eds)
- 124 Lie groupoids and Lie algebroids in differential geometry, K. MACKENZIE
- 125 Commutator theory for congruence modular varieties, R. FREESE & R. MCKENZIE
- 126 Van der Corput's method of exponential sums, S.W. GRAHAM & G. KOLESNIK
- 127 New directions in dynamical systems, T.J. BEDFORD & J.W. SWIFT (eds)
- 128 Descriptive set theory and the structure of sets of uniqueness, A.S. KECHRIS & A. LOUVEAU
- 129 The subgroup structure of the finite classical groups, P.B. KLEIDMAN & M.W. LIEBECK
- 130 Model theory and modules, M. PREST
- 131 Algebraic, extremal & metric combinatorics, M-M. DEZA, P. FRANKL & I.G. ROSENBERG (eds)
- 132 Whitehead groups of finite groups, ROBERT OLIVER
- 133 Linear algebraic monoids, MOHAN S. PUTCHA
- 134 Number theory and dynamical systems, M. DODSON & J. VICKERS (eds)
- 135 Operator algebras and applications, 1, D. EVANS & M. TAKESAKI (eds)
- 136 Operator algebras and applications, 2, D. EVANS & M. TAKESAKI (eds)
- 137 Analysis at Urbana, I, E. BERKSON, T. PECK, & J. UHL (eds)

- 138 Analysis at Urbana, II, E. BERKSON, T. PECK, & J. UHL (eds)
 139 Advances in homotopy theory, S. SALAMON, B. STEER & W. SUTHERLAND (eds)
 140 Geometric aspects of Banach spaces, E.M. PEINADOR & A. RODES (eds)
 141 Surveys in combinatorics 1989, J. SIEMONS (ed)
 142 The geometry of jet bundles, D.J. SAUNDERS
 143 The ergodic theory of discrete groups, PETER J. NICHOLLS
 144 Introduction to uniform spaces, I.M. JAMES
 145 Homological questions in local algebra, JAN R. STROOKER
 146 Cohen-Macaulay modules over Cohen-Macaulay rings, Y. YOSHINO
 147 Continuous and discrete modules, S.H. MOHAMED & B.J. MÜLLER
 148 Helices and vector bundles, A.N. RUDAKOV *et al*
 149 Solitons, nonlinear evolution equations and inverse scattering, M. ABLOWITZ & P. CLARKSON
 150 Geometry of low-dimensional manifolds 1, S. DONALDSON & C.B. THOMAS (eds)
 151 Geometry of low-dimensional manifolds 2, S. DONALDSON & C.B. THOMAS (eds)
 152 Oligomorphic permutation groups, P. CAMERON
 153 L-functions and arithmetic, J. COATES & M.J. TAYLOR (eds)
 154 Number theory and cryptography, J. LOXTON (ed)
 155 Classification theories of polarized varieties, TAKAO FUJITA
 156 Twistors in mathematics and physics, T.N. BAILEY & R.J. BASTON (eds)
 157 Analytic pro- p groups, J.D. DIXON, M.P.F. DU SAUTOY, A. MANN & D. SEGAL
 158 Geometry of Banach spaces, P.F.X. MÜLLER & W. SCHACHERMAYER (eds)
 159 Groups St Andrews 1989 volume 1, C.M. CAMPBELL & E.F. ROBERTSON (eds)
 160 Groups St Andrews 1989 volume 2, C.M. CAMPBELL & E.F. ROBERTSON (eds)
 161 Lectures on block theory, BURKHARD KÜLSHAMMER
 162 Harmonic analysis and representation theory, A. FIGA-TALAMANCA & C. NEBBIA
 163 Topics in varieties of group representations, S.M. VOVSI
 164 Quasi-symmetric designs, M.S. SHRIKANDE & S.S. SANE
 165 Groups, combinatorics & geometry, M.W. LIEBECK & J. SAXL (eds)
 166 Surveys in combinatorics, 1991, A.D. KEEDWELL (ed)
 167 Stochastic analysis, M.T. BARLOW & N.H. BINGHAM (eds)
 168 Representations of algebras, H. TACHIKAWA & S. BRENNER (eds)
 169 Boolean function complexity, M.S. PATERSON (ed)
 170 Manifolds with singularities and the Adams-Novikov spectral sequence, B. BOTVINNIK
 171 Squares, A.R. RAJWADE
 172 Algebraic varieties, GEORGE R. KEMPF
 173 Discrete groups and geometry, W.J. HARVEY & C. MACLACHLAN (eds)
 174 Lectures on mechanics, J.E. MARSDEN
 175 Adams memorial symposium on algebraic topology 1, N. RAY & G. WALKER (eds)
 176 Adams memorial symposium on algebraic topology 2, N. RAY & G. WALKER (eds)
 177 Applications of categories in computer science, M. FOURMAN, P. JOHNSTONE, & A. PITTS (eds)
 178 Lower K- and L-theory, A. RANICKI
 179 Complex projective geometry, G. ELLINGSRUD *et al*
 180 Lectures on ergodic theory and Pesin theory on compact manifolds, M. POLLICOTT
 181 Geometric group theory I, G.A. NIBLO & M.A. ROLLER (eds)
 182 Geometric group theory II, G.A. NIBLO & M.A. ROLLER (eds)
 183 Shintani zeta functions, A. YUKIE
 184 Arithmetical functions, W. SCHWARZ & J. SPILKER
 185 Representations of solvable groups, O. MANZ & T.R. WOLF
 186 Complexity: knots, colourings and counting, D.J.A. WELSH
 187 Surveys in combinatorics, 1993, K. WALKER (ed)
 189 Locally presentable and accessible categories, J. ADAMEK & J. ROSICKY
 190 Polynomial invariants of finite groups, D.J. BENSON
 191 Finite geometry and combinatorics, F. DE CLERCK *et al*
 192 Symplectic geometry, D. SALAMON (ed)
 193 Computer algebra and differential equations, E. TOURNIER (ed)
 195 Arithmetic of blowup algebras, WOLMER VASCONCELOS
 196 Microlocal analysis for differential operators, A. GRIGIS & J. SJÖSTRAND
 197 Two-dimensional homotopy and combinatorial group theory, C. HOG-ANGELONI,
 W. METZLER & A.J. SIERADSKI (eds)
 198 The algebraic characterization of geometric 4-manifolds, J.A. HILLMAN
 199 Invariant potential theory in the unit ball of \mathbb{C}^n , MANFRED STOLL
 201 Singularities, JEAN-PAUL BRASSELET (ed)

Cambridge University Press
978-0-521-46631-8 - Singularities: Lille 1991
Edited by Jean-Paul Brasselet
Frontmatter
[More information](#)

London Mathematical Society Lecture Note Series. 201

Singularities

Lille 1991

Edited by

Jean-Paul Brasselet
CIRM, Luminy



Cambridge University Press
978-0-521-46631-8 - Singularities: Lille 1991
Edited by Jean-Paul Brasselet
Frontmatter
[More information](#)

CAMBRIDGE UNIVERSITY PRESS
Cambridge, New York, Melbourne, Madrid, Cape Town,
Singapore, São Paulo, Delhi, Mexico City

Cambridge University Press
The Edinburgh Building, Cambridge CB2 8RU, UK

Published in the United States of America by Cambridge University Press, New York

www.cambridge.org
Information on this title: www.cambridge.org/9780521466318

© Cambridge University Press 1994

This publication is in copyright. Subject to statutory exception
and to the provisions of relevant collective licensing agreements,
no reproduction of any part may take place without the written
permission of Cambridge University Press.

First published 1994

A catalogue record for this publication is available from the British Library

Library of Congress Cataloguing in Publication Data

ISBN 978-0-521-46631-8 Paperback

Cambridge University Press has no responsibility for the persistence or
accuracy of URLs for external or third-party internet websites referred to in
this publication, and does not guarantee that any content on such websites is,
or will remain, accurate or appropriate. Information regarding prices, travel
timetables, and other factual information given in this work is correct at
the time of first printing but Cambridge University Press does not guarantee
the accuracy of such information thereafter.

Contents

Introduction	vii
List of participants	xii
On complex projective hypersurfaces which are homology P_n 's G. BARTHEL and A. DIMCA	1
Generic geometry and duality J.W. BRUCE	29
An arithmetical factorization for the critical point set of some map germs from \mathbb{C}^2 to \mathbb{C}^2 F. DELGADO	61
Trivializations of stratified spaces with bounded differential M. FERRAROTTI	101
Moduli for singularities G.-M. GREUEL and G. PFISTER	119
Conormal space and Jacobian modules: A short dictionary J.-P. HENRY & M. MERLE	147
Weak Lefschetz type and topological q -completeness L. KAUP	175
Volumes and lattice points - proof of a conjecture of L. Ehrenpreis B. LICHTIN	211
Connexions méromorphes B. MALGRANGE	251
Deformations of maps on complete intersections, Damous K_V -equivalence and bifurcations D. MOND and J. MONTALDI	263
Cycles évanescents et faisceaux pervers II: cas des courbes planes réductibles L. NARVÁEZ-MACARRO	285
A desingularization theorem for systems of microdifferential equations O. NETO	325

Cambridge University Press
978-0-521-46631-8 - Singularities: Lille 1991
Edited by Jean-Paul Brasselet
Frontmatter
[More information](#)

vi	Contents
Topological stability A. DU PLESSIS and C.T.C. WALL	351
Boundary fronts and caustics and their metamorphosis I. SCHERBACK	363
Quid des stratifications canoniques R. THOM	375
Irrégularité des revêtements cycliques M. VAQUIÉ	383

INTRODUCTION

The international congress “Singularities in Geometry and Topology”, organized by the “Unité de Recherche Associée au CNRS” Geometry, Analysis and Topology of Lille (France) was held from 3 to 8 June 1991. More than 230 researchers and students coming from 28 countries met to discuss themes concerning singularities in Geometry, Algebraic Topology and Algebraic Geometry. The Scientific Committee of the congress was composed of A. Aroca (Valladolid), H. Hamm (Münster), J.L. Koszul (Grenoble), B. Teissier (ENS, Paris), A. Verjovsky (ICTP, Trieste) and C.T.C. Wall (Liverpool). The congress was sponsored by the CNRS, the French Ministry of Education, the French Ministry of Research and Technology, the European Project “Singularities”, the Region “Nord-Pas de Calais”, the Lille and Villeneuve d’Ascq Municipalities and the local University Authorities : the “Université des Sciences et Techniques de Lille-Flandres-Artois”, its Mathematics Department and the “Geometry-Analysis-Topology” Unit of the CNRS. There were many participants from Eastern European countries and for many of them it was the first opportunity to take part in a congress outside their country.

The Scientific Committee proposed 12 plenary conferences and 36 specialized conferences. In addition, a system of free conferences was organized in such a way that everyone willing to speak had the possibility of giving a short talk. These free conferences have been published in a special issue of the IRMA publications of Lille University*.

The papers of this volume concern 16 of the plenary and specialized conferences and deal with different points of view about singularities in geometry and topology.

* Publications IRMA, UFR de Mathématiques, USTL, 59655 Villeneuve d’Ascq Cedex, France

A.A. du Plessis and C.T.C. Wall give a survey on the geometry of topological stability for C^∞ maps. D.Mond and J. Montaldi extend a result of J.Damon about the deformations of mappings of complete intersections and bifurcations. As an application, they compute the discriminant Milnor number of a map. F. Delgado studies the topological type of the polar curve. He exhibits an arithmetical decomposition of the polar curve and obtains relations with the description of branches.

I. Scherback looks at the metamorphosis of wavefronts and caustics : if the initial wavefront is a surface with a boundary, new singularities arise. She gives a description and a classification of such singularities in terms of bifurcation sets of boundary singularities. The geometry of singularities is presented in the paper of J.W. Bruce, he describes applications to the differential geometry of surfaces in Euclidean and projective 3-space.

B. Malgrange gives a survey of the main known results about meromorphic connexions (in the regular and irregular cases) and local monodromy of algebraic equations, particularly results about the Riemann problem. The paper of B. Lichtin concerns asymptotics of lattice points and D-modules. The analytic theory of singularities and tools like the Newton polyhedron at infinity are used in the study of volumes of families of bounded semi-algebraic sets. The main result gives a proof of a conjecture of L.Ehrenpreis concerning hypoelliptic polynomials. L. Narvaez-Macarro describes the vanishing cycles and perverse sheaves relative to reducible curves.

In his paper on systems of micro-differential equations, O. Neto proves desingularization theorems for Lagrangian curves and for regular holonomic systems with support on a Lagrangian curve. This is achieved by showing that the blow-up of a regular holonomic system of microdifferential equations is regular holonomic and computing its support.

J.P. Henry and M. Merle give new results about equisingularity of the discriminant. Following ideas of T.Gaffney, they translate equisingularity conditions for isolated singularities of complete intersections in terms of integral dependance and multiplicities of modules. In this vocabulary, the

conormal space is the geometric space associated to the jacobian module and the Buchsbaum-Rees multiplicity of the jacobian module plays an important role.

R. Thom gives a survey of canonical stratifications, especially stratifications of morphisms, for example, the existence of canonical stratification of the Tarski-Seidenberg projection, stratification of the space of jets, stratification of algebraic sets... In the case of spaces, M. Ferrarotti proves the existence of trivializations of a riemannian stratified space with differential of bounded norm. This result is applied to the local finiteness of volume.

G.M. Greuel and G. Pfister give a construction of moduli spaces for singular objects in projective theory. They study moduli spaces for curve singularities and for modules over the local ring of a fixed curve singularity. This provides a classification of irreducible plane curve singularities. M. Vaquié generalizes a result of Zariski about the computation of the irregularity of a cyclic covering of the complex projective plane ramified over a curve whose singularities are ordinary double points and cuspidal points. Using resolution of singularities, he computes the irregularity in the general case and proves vanishing theorems for the irregularity.

G. Barthel and A. Dimca study the topology of hypersurfaces which are projective homology manifolds. Their construction provides interesting examples of homology \mathbf{P}^n 's with isolated singularities and allows one to classify such varieties. L. Kaup studies connectedness of a space ; he gives a general statement about Lefschetz theorems for singular varieties and the relation with topological completeness for complex spaces.

I would like to thank the Scientific Committee, all speakers, participants and administrative staff who made this congress a success, also the London Mathematical Society for publishing these proceedings.

Jean-Paul BRASSELET

Organizer of the Congress

Plenary Conferences

- * J.W. BRUCE, Generic Geometry and Duality.
 - F. CANO, Polyèdre de Newton dans les équations différentielles.
 - T. GAFFNEY, Equisingularity of mappings : the future through the past.
 - M. GORESKEY, Lefschetz fixed point formula on singular spaces.
 - D.T. LE, Topologie des singularités et entrelacs complexes.
 - R. MACPHERSON, Lefschetz numbers of Hecke correspondences.
 - * B. MALGRANGE, Connexions à singularités irrégulières.
 - C. SABBAAH, Intégration dans les fibres d'un morphisme analytique ou algébrique.
 - B. TEISSIER, Classes caractéristiques.
 - * R. THOM, Quid des stratifications canoniques ?
 - * C.T.C. WALL, Stabilité topologique.
 - S. ZUCKER, \mathcal{L}^2 -cohomology and singularities.
- * Published in this volume.

Specialized Conferences

- B. CENKL, Cohomologie d'intersection modérée.
 D. CERVEAU, Cohomologie relative des formes différentielles.
 J. DAMON, Singular Milnor fibers and higher multiplicities for non isolated Hypersurface Singularities.
- * F. DELGADO, An arithmetical Decomposition for the polar Curve.
 * A. DIMCA, Topology of hypersurfaces, results and open problems.
 * M. FERRAROTTI, Trivializations of stratified Spaces with bounded Differential.
- * G.M. GREUEL, On tame and wild Curve Singularities.
 * L. KAUP, Theorems of Lefschetz type and topological q-completeness.
 A. KHOVANSKII, Polyèdres de Newton.
- * B. LICHTIN, Asymptotic of Lattice Points and D-modules.
 F. LOESER, Déterminants et monodromies.
 I. LUENGO, Strates de l'espace de paramètres de courbes.
 C. MCCRORY, Secant Planes of Space Curves.
- * M. MERLE, Equisingularité du discriminant.
 * J. MONTALDI, Critical points of \mathbf{C}^* -invariant Functions.
 * L. NARVAEZ-MACARRO, Cycles évanescents et faisceaux pervers.
 * O. NETO, A duality and asymetry in symplectic Geometry and Systems of micro-differential Equations.
 G. PFISTER, Local moduli problems and Singularities.
 J.J. RISLER, Germes de courbes planes.
- * I. SCHERBACK, Boundary of wave fronts and caustics and their metamorphosis.
 A. SEBBAR, Equations différentielles monodromiques et variétés abéliennes.
 R. SJAMAAR, Espaces de phase réduits et quantification géométrique.
- * M. VAQUIE, Irrégularité des revêtements cycliques des surfaces
 V. VERSHININ, Cobordism of Manifolds with Singularities.
- * Published in this volume.

List of participants

Mohammed ABLY Lille France
 Abdelhak ABOUQATEB Lille France
 Abdallah AL AMRANI Strasbourg France
 Klaus ALTMANN Kaiserslautern Germany
 Christian ANGHEL Orsay France
 Enrique ARTAL-BARTOLO Genève Swiss
 Eric AURISSERGUES Lille France
 Reynir AXELSSON Reyjavik Iceland
 Daniel BARLET Nancy France
 Raymond BARRE Valenciennes France
 Gottfried BARTHEL Konstanz Germany
 Belkacem BENDIFFALAH Marseille France
 Michèle BENYOUNES Lille France
 Isabel BERMEJO La Laguna Spain
 Lev BIRBRAIR Jerusalem Israel
 Havald BJAR Oslo Norway
 Jean-Paul BRASSELET Marseille France
 James William BRUCE Liverpool UK
 Alexandre BRUNO Moscow CEI
 Ragnar BUCHWEITZ Toronto Canada
 Javolim BURES Prague Czechoslovakia
 Bernard CALLENAERE Lille France
 Antonio CAMPILLO Valladolid Spain
 Felipe CANO Valladolid Spain
 Josi CANO Valladolid Spain
 Manuel CARNICIER Valladolid Spain
 Pierrette CASSOU-NOGUES Talence France
 Francisco CASTRO-JIMENEZ Sevilla Spain
 Bohumil CENKL Boston USA
 Dominique CERVEAU Rennes France
 Marc CHARDIN Palaiseau France
 Denis CHENIOT Marseille France
 Sergey CHMUTOV Pereslavl-Zalessky CEI
 Jan CHRISTOPHERSEN Oslo Norway
 Gérard COEURE Lille France
 Cyrille CRAPSKY Nancy France
 James DAMON Chapel-Hill USA
 Edouard DATRINIDADE Valenciennes France
 Félix DELGADO DE LA MATA Valladolid Spain
 Alexandru DIMCA Bonn Germany
 Benaouda DJAMAI Lille France
 Philippe DU BOIS Angers France
 Andrew DU PLESSIS Aarhus Denmark

List of participants

xiii

Nicolas DUPONT Lille France
 Anne DUVAL Lille France
 Mohammed EL AMRANI Angers France
 Mohammed EL HAOUARI Lille France
 Aziz EL KACIMI Valenciennes France
 Abdelghani EL MAZOUNI Lille France
 Fouad EL ZEIN quadis France
 Yves FELIX Louvain-la-Neuve Belgium
 Massimo FERRAROTTI Pisa Italy
 Karl-Heinz FIESELER Konstanz Germany
 Javier FINAT Lille France
 Laurence FOURRIER Toulouse France
 Louis FUNAR Orsay France
 Terence GAFFNEY Boston USA
 Françoise GEANDIER Nancy France
 Peter GIBLIN Liverpool UK
 Philippe GIMENEZ Grenoble France
 Bouchra GMIRA Tetouan Morocco
 François GOICHOT Valenciennes France
 Mark GORESKY Boston USA
 Victor V. GORYUNOV Moscow CEI
 Jean-Michel GRANGER Angers France
 Gert-Martin GREUEL Kaiserslautern Germany
 Boguslaw HAJDUK Wroclaw Poland
 Helmut HAMM Münster Germany
 Youssef HANTOUT Lille France
 Alain HENAUT Bordeaux France
 Jean-Pierre HENRY Palaiseau France
 Michel HICKEL Talence France
 Johannes HUEBSCHMANN Lille France
 Marc HUTTNER Lille France
 Tony IARROBINO Boston USA
 Patrick IGLESIAS Lyon France
 Schynichi IZUMIYA Sapporo Japan
 Michel JAMBU Nantes France
 Piotr JAWORSKI Warszawa Poland
 Ahmed JEDDI Nancy France
 Trygve JOHNSEN Tromsø Norway
 Abdelhak KABILA Valenciennes France
 Jean-Michel KANTOR quadis France
 Yakov KARPISHPAN Baltimore USA
 Ludger KAUP Konstanz Germany
 Askold KHOVANSKII Moscow CEI
 Martine KLUGHERTZ Toulouse France
 Robert Jan KOOMAN Lille France

Vladimir KOSTOV Utrecht Netherlands
 Jean-Louis KOSZUL Grenoble France
 Tzee-Char KUO Epping Australia
 Michał KWIECINSKI Marseille France
 Rafael LABRERO Valladolid Spain
 Serguei K. LANDO Pereslavl-Zalessky CEI
 Olav Arnfinn LAUDAL Oslo Norway
 Yves LAURENT Grenoble France
 Dũng Trùng LE quadis France
 Van Thanh LE Hanoi Vietnam
 Danièle LEFEBVRE Lille France
 André LEGRAND Toulouse France
 Daniel LEHMANN Lille France
 Josiane LEHMANN-LEJEUNE Lille France
 François LESCURE Lille France
 Noureddine LHALOUI Lille France
 Ben LICHTIN Bordeaux France
 François LOESER Palaiseau France
 Stanisław LOJASIEWICZ Krakow Poland
 Ignacio LUENGO Madrid Spain
 Robert MACPHERSON Cambridge USA
 Jon MAGNUSSON Reykjavik Iceland
 Philippe MAISONOBE Nice France
 Bernard MALGRANGE Grenoble France
 Martin MARKL Prague Czechoslovakia
 Pierre MARRY quadis France
 Bernard MARTIN Berlin Germany
 David MASSEY Boston USA
 Jean-François MATTEI Toulouse France
 Danielle MATTHYS Lille France
 Kodjo MAWOUSI quadis France
 Mostafa MBEKHTHA Lille France
 Clint MCCRORY Athens USA
 Michel MERLE Nice France
 Françoise MICHEL Angers France
 Nicolae MIHALACHE Bucharest Roumania
 Michel MINICONI Nice France
 David MOND Coventry UK
 James MONTALDI Nice France
 Marcel MORALES Grenoble France
 Piotr MORMUL Warsaw Poland
 Witold MOZGAWA Lublin Poland
 Gerd MULLER Mainz Germany
 Luis NARVAEZ MACARRO Sevilla Spain
 Vicente NAVARRO AZNAR Barcelone Spain

Cambridge University Press
 978-0-521-46631-8 - Singularities: Lille 1991
 Edited by Jean-Paul Brasselet
 Frontmatter
[More information](#)

List of participants

xv

Jan NEKOVAR Prague Czechoslovakia
 Orlando NETO Lisboa Portugal
 Marcel NICOLAU Barcelone Spain
 Takashi NISHIMURA Yokohama Japan
 Carolina Ana NUMEZ-JIMENEZ Valladolid Spain
 Juan NUNO BALLESTEROS Burjasot Spain
 Philippe NUSS Strasbourg France
 Armand NWATSOCK Lille France
 Donal O'SHEA South Hadley USA
 Karl OELJEKLAUS Lille France
 Mutsuo OKA Tokyo Japan
 Patrice ORRO Chambéry France
 Victor PALAMODOV Moscow CEI
 Stefan PAPADIMA Bucharest Roumania
 William PARDON Durham USA
 Emmanuel PAUL Toulouse France
 Wieslaw PAWLICKI Krakow Poland
 Rosa PERAIRE Barcelone Spain
 Tomas PEREZ Valladolid Spain
 Gerhard PFISTER Toronto Canada
 Joan PORTI PIQUE Barcelone Spain
 Marie-Thérèse POURPRIX Lille France
 Ana REGUERA Valladolid Spain
 Jean-Jacques RISLER quadis France
 Gérard ROBERT quadis France
 Claude ROCHE Dijon France
 Marko ROCZEN Berlin Germany
 Félice RONGA Genève Swiss
 Ile RUNAR Oslo Norway
 Claude SABBAH Palaiseau France
 Jordi SALUDES Barcelone Spain
 Martin SARALEGI Madrid Spain
 Jacques SAULOY Toulouse France
 Pierre SCHAPIRA quadis France
 Daniel SCHAUB Angers France
 Inna SCHERBACK Pereslavl-Zalessky CEI
 Marie-Hélène SCHWARTZ Lille France
 Jose SEADE Mexico Mexico
 Ahmed SEBBAR Bordeaux France
 A. SEVENSTER Amsterdam Netherlands
 Dirk SIERSMA Utrecht Netherlands
 Arvid SIQUELAND Oslo Norway
 Reyer SJAMAAR Cambridge USA
 Arne B. SLETSJOE Oslo Norway
 Valeri SMYSHLAEV Leningrad CEI

Ahmadjohn SOLEEV Samarkand CEI
 Dag Einar SOMMERVOLL Oslo Norway
 Kim SOV Lille France
 Mark SPIVAKOVSKY Cambridge USA
 Henri STERK Amsterdam Netherlands
 Jan STEVENS Hamburg Germany
 Aïda SURUBARU Lille France
 Jacek SWIATKOWSKI Wrocław Poland
 Aviva SZPIRGLAS Villetaneuse France
 Daniel TANRE Lille France
 Joseph TAPIA Toulouse France
 Farid TARI Aarhus Denmark
 Bernard TEISSIER quadis France
 Tomohide TERASOMA Mannheim Germany
 René THOM quadis France
 Jean-Claude THOMAS Lille France
 Mihai TIBAR Utrecht Netherlands
 Pedro TSHINGI Lille France
 Gijs TUYNMAN Lille France
 Arkady VAINTRIOB Austin USA
 Michel VAQUIE quadis France
 Valerio VASSALLO Lille France
 Vladimir VERSHININ Novosibirsk CEI
 Wim VEYS Leuven Belgium
 Nguyen VIET DUNG Hanoi Vietnam
 C.T.C. WALL Liverpool UK
 Georges G. WEILL New York USA
 Klaus WIRTHMULLER Kaiserslautern Germany
 Zdzistaw WOJTKOWIAK Nice France
 Robert WOLAK Krakow Poland
 David YAVIN Cambridge USA
 Yosi YOMDIN Rehovot Israel
 Xuan-Being YU Pekin China
 Alexandru ZAHARIA Bucharest Roumania
 Vladimir M. ZAKALYUKIN Moscou CEI
 Abdellatif ZEGGAR Lille France
 Jianyi ZHOU Marseille France
 Steven ZUCKER Baltimore USA
 Maria Angeles ZURRO Valladolid Spain