

Lecture Notes in Mathematics

Edited by A. Dold and B. Eckmann

Subseries: USSR

Adviser: L.D. Faddeev, Leningrad

1334

Yu. G. Borisovich Yu. E. Gliklikh (Eds.)

Global Analysis –
Studies and Applications III



Springer-Verlag

Berlin Heidelberg New York London Paris Tokyo

Editors

Yuriĭ G. Borisovich

Yuriĭ E. Gliklikh

Department of Mathematics, Voronezh State University
394693, Voronezh, USSR

Consulting Editor

A. M. Vershik

Department of Mathematics and Mechanics, Leningrad State University
198904, Petrodvorets, Leningrad, USSR

The articles in this volume are translations of articles that appeared originally in Russian in the books "Global'nyi analiz i matematicheskaya fizika" and "Geometriya i teoriya osobennostei v nelineinykh uravneniyakh" published by Voronezh University Press in 1987.

Mathematics Subject Classification (1980): 58-02, 58C, 58D, 58E, 58F, 58G

ISBN 3-540-50019-7 Springer-Verlag Berlin Heidelberg New York

ISBN 0-387-50019-7 Springer-Verlag New York Berlin Heidelberg

This work is subject to copyright. All rights are reserved, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, re-use of illustrations, recitation, broadcasting, reproduction on microfilms or in other ways, and storage in data banks. Duplication of this publication or parts thereof is only permitted under the provisions of the German Copyright Law of September 9, 1965, in its version of June 24, 1985, and a copyright fee must always be paid. Violations fall under the prosecution act of the German Copyright Law.

© Springer-Verlag Berlin Heidelberg 1988

Printed in Germany

Printing and binding: Druckhaus Beltz, Hemsbach/Bergstr.
2146/3140-543210

PREFACE

This Lecture Notes volume, a sequel to volumes II08 and I2I4, presents to English speaking readers further two issues of the Voronezh University Press series "Novoe v global'nom analize" (New Developments in Global Analysis). These issues, published in Russian in March, 1987 and in November, 1987, are entitled "Global Analysis and Mathematical Physics" and "Geometry and Theory of Singularities in Nonlinear Equations", respectively. For this translation volume we have selected the articles of survey (expository) character and papers giving detailed accounts of research results. Short communications and the survey article of Yu.P.Solov'ev (March, 1987) are omitted here (the material of the latter will be published in English elsewhere).

The articles are ordered chronologically. The date of publication in Russian is indicated in the Contents.

Assistance of all the members of the series editorial board, especially A.T.Fomenko, A.S.Mishchenko, S.P.Novikov, M.M.Postnikov, A.M.Vershik, is highly appreciated.

Yu.G.Borisovich
Yu.E.Gliklikh

December, 1987

CONTENTS

MARCH, 1987

Borisovich A.Yu. Plateau operator and bifurcations of two-dimensional minimal surfaces	1
Borisovich Yu.G. and Fomenko T.N. Homological methods in the theory of periodic and equivariant maps	21
Dubrovin B.A. Theory of operators and real algebraic geometry	42
Gel'man B.D. On the structure of the set of solutions for inclusions with multivalued operators	60
Krasil'shchik I.S. Schouten bracket and canonical algebras	79
Sapronov Yu.I. Multidimensional sleeping tops	111
Sternin B.Yu. and Shatalov V.E. Laplace-Radon integral operators and singularities of solutions of differential equations on complex manifolds	129
Zvyagin V.G. On the number of solutions for certain boundary-value problems	157

NOVEMBER, 1987

Arnol'd V.I. Contact structure, relaxation oscillations and singular points of implicit differential equations	173
Bliznyakov N.M. Topological index estimates	180
Borisovich Yu.G. Modern approach to the theory of topological characteristics of nonlinear operators.I.	199
Fomenko A.T. Qualitative geometrical theory of integrable systems. Classification of isoenergetic surfaces and bifurcation of Liouville tori at the critical energy values	221
Gliklikh Yu.E. Geometrical aspects of Nelson's stochastic quantization	246
Sternin B.Yu. and Shatalov V.E. Singularities of solutions of differential equations on complex manifolds (characteristic case)	269
Varchenko A.N. Image of period mapping for simple singularities	294
Vershik A.M. and Gershkovich C.Ya. The geometry of the nonholonomic sphere for three-dimensional Lie group	309