

IZRAIL M. GELFAND

COLLECTED
PAPERS

VOLUME I

Edited by
S.G. Gindikin V.W. Guillemin A.A. Kirillov
B. Kostant S. Sternberg



SPRINGER-VERLAG
BERLIN HEIDELBERG NEW YORK
LONDON PARIS TOKYO

Table of contents

Part I. Survey lectures and articles of general content

1. Some aspects of functional analysis and algebra	3
2. On some problems of functional analysis	27
3. Some questions of analysis and differential equations	37
4. Integral geometry and its relation to the theory of group representations	56
5. On elliptic equations	65
6. Automorphic functions and the theory of representations	76
7. The cohomology of infinite dimensional Lie algebras; some questions of integral geometry	88

Part II. Banach spaces and normed rings

1. Sur un lemme de la théorie des espaces linéaires	107
2. Abstrakte Funktionen und lineare Operatoren	113
3. On one-parametrical groups of operators in a normed space	163
4. On normed rings	169
5. To the theory of normed rings. II. On absolutely convergent trigonometrical series and integrals	172
6. To the theory of normed rings. III. On the ring of almost periodic functions	175
7. On the theory of characters of commutative topological groups (with D.A. Rajkov)	177
8. Normierte Ringe	181
9. Über verschiedene Methoden der Einführung der Topologie in die Menge der maximalen Ideale eines normierten Ringes (mit G.E. Shilov)	202
10. Ideale und primäre Ideale in normierten Ringen	216
11. Zur Theorie der Charaktere der Abelschen topologischen Gruppen	223
12. Über absolut konvergente trigonometrische Reihen und Integrale	225
13. On the imbedding of normed rings into the ring of operators in Hilbert space (with M.A. Najmark)	241
14. Commutative normed rings (with D.A. Rajkov and G.E. Shilov)	258
15. Normed rings with an involution and their representations (with M.A. Najmark)	364

Part III. Differential equations and mathematical physics

1. Eigenfunction expansions for equations with periodic coefficients . . .	401
2. On the determination of a differential equation from its spectral function (with B.M. Levitan)	405
3. On a simple identity for eigenvalues of second order differential operator (with B.M. Levitan)	457
4. Solution of quantum field equations (with R.A. Minlos)	462
5. On the structure of the regions of stability of linear canonical systems of differential equations with periodic coefficients (with V.B. Lidskij)	466
6. Eigenfunction expansions for differential and other operators (with A.G. Kostyuchenko)	505
7. On identities for eigenvalues of a second order differential operator	510
8. Some problems in the theory of quasilinear equations	518
9. On a theorem of Poincaré (with I.I. Piatetski-Shapiro)	605
10. Fractional powers of operators and Hamiltonian systems (with L.A. Dikij)	610
11. A family of Hamiltonian structures related to nonlinear integrable differential equations (with L.A. Dikij)	625
12. Asymptotic behaviour of the resolvent of Sturm-Liouville equations and the algebra of the Korteweg-de Vries equations (with L.A. Dikij)	647
13. The resolvent and Hamiltonian systems (with L.A. Dikij)	684
14. Integrable nonlinear equations and the Liouville theorem (with L.A. Dikij)	697
15. Hamiltonian operators and algebraic structures related to them (with I.Ya. Dorfman)	707
16. The Schouten bracket and Hamiltonian operators (with I.Ya. Dorfman)	722
17. Hamiltonian operators and the classical Yang-Baxter equation (with I.Ya. Dorfman)	726

Essays in honour of Izrail M. Gelfand

On his fiftieth birthday (by M.I. Vishik, A.N. Kolmogorov, S.V. Fomin, and G.E. Shilov)	735
On his sixtieth birthday (by S.G. Gindikin, A.A. Kirillov, and D.B. Fuks; O.V. Lokysievskij and N.N. Chentsov; M.B. Berkinblit, Yu.M. Vasil'ev, and M.L. Shik)	753
On his seventieth birthday (by N.N. Bogolyubov, S.G. Gindikin, A.A. Kirillov, A.N. Kolmogorov, S.P. Novikov, and L.D. Faddeev)	812
Some remarks on I.M. Gelfand's works (by V.W. Guillemin and S. Sternberg)	831
Tentative table of contents for volumes II and III	837
Bibliography	843
Acknowledgements	883