

Contents

S. P. Novikov's Preface	xi
1 <i>J. Milnor. On manifolds homeomorphic to the 7-sphere</i>	1
§ 1. The invariant $\lambda(M^7)$	2
§ 2. A partial characterization of the n -sphere	4
§ 3. Examples of 7-manifolds	6
§ 4. Miscellaneous results	8
References	9
2 <i>M. Kervaire and J. Milnor. Groups of homotopy spheres. I</i>	11
§ 1. Introduction	11
§ 2. Construction of the group Θ_n	12
§ 3. Homotopy spheres are s -parallelizable	15
§ 4. Which homotopy spheres bound parallelizable manifolds?	17
§ 5. Spherical modifications	20
§ 6. Framed spherical modifications	27
§ 7. The groups bP_{2k}	35
§ 8. A cohomology operation	40
References	47
3 <i>S. P. Novikov. Homotopically equivalent smooth manifolds</i>	49
Introduction	49
CHAPTER I. The fundamental construction	53
§ 1. Morse's surgery	53
§ 2. Relative π -manifolds	56
§ 3. The general construction	60
§ 4. Realization of classes	62

§ 5. The manifolds in one class	84
§ 6. One manifold in different classes	88
CHAPTER II. Processing the results	103
§ 7. The Thom space of a normal bundle. Its homotopy structure	103
§ 8. Obstructions to a diffeomorphism of manifolds having the same homotopy type and a stable normal bundle	111
§ 9. Variation of a smooth structure keeping triangulation preserved	115
§ 10. Varying smooth structure and keeping the triangulation preserved. Morse surgery	132
CHAPTER III. Corollaries and applications	150
§ 11. Smooth structures on Cartesian product of spheres	150
§ 12. Low-dimensional manifolds. Cases $n = 4, 5, 6, 7$	159
§ 13. Connected sum of a manifold with Milnor's sphere	164
§ 14. Normal bundles of smooth manifolds	167
Appendix 1. Homotopy type and Pontrjagin classes	168
Appendix 2. Combinatorial equivalence and Milnor's microbundle theory	171
Appendix 3. On groups $\theta^{4k-1}(\partial\pi)$	175
Appendix 4. Embedding of homotopy spheres into Euclidean space and the suspension stable homomorphism	178
References	181
4 S. P. Novikov. Rational Pontrjagin classes. Homeomorphism and homotopy type of closed manifolds	185
Introduction	186
§ 1. Signature of a cycle and its properties	187
§ 2. The basic lemma	189
§ 3. Theorems on homotopy invariance. Generalized signature theorem	192
§ 4. The topological invariance theorem	197
§ 5. Consequences of the topological invariance theorem	199
Appendix (V. A. Rokhlin). Diffeomorphisms of the manifold $S^2 \times S^3$	201
References	202

5	<i>S. P. Novikov. On manifolds with free abelian fundamental group and their applications (Pontrjagin classes, smooth structures, high-dimensional knots)</i>	205
	Introduction	205
	§ 1. Formulation of results	208
	§ 2. The proof scheme of main theorems	210
	§ 3. A geometrical lemma	213
	§ 4. An analog of the Hurewicz theorem	217
	§ 5. The functor $P = \text{Hom}_c$ and its application to the study of homology properties of degree one maps	221
	§ 6. Stably freeness of kernel modules under the assumptions of Theorem 3	227
	§ 7. The homology effect of a Morse surgery	230
	§ 8. Proof of Theorem 3	232
	§ 9. Proof of Theorem 6	233
	§ 10. One generalization of Theorem 5	236
	Appendix 1. On the signature formula	237
	Appendix 2. Unsolved questions concerning characteristic class theory	242
	Appendix 3. Algebraic remarks about the functor $P = \text{Hom}_c$	248
	References	251
6	<i>R. Kirby. Stable homeomorphisms and the annulus conjecture</i>	253
	References	260