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Buchanzeigen

Global Aspects of Classical Integrable Systems. By Richard H. Cushman and Larry M. Bates. Birkhäuser, Basel 1997. xvi, 435 pp. SFr. 68.- ISBN 3-7643-5485-2.

Foreword – Introduction. The mathematical pendulum – Exercises – I. The harmonic oscillator. Hamilton's equations and S^1 symmetry – S^1 energy momentum mapping – $U(2)$ momentum mapping – The Hopf fibration – Invariant theory and reduction – Exercises – II. Geodesics on S^3 . The geodesic and Delaunay vector fields – The $SO(4)$ momentum mapping – The Kepler problem – Exercises – III. The Euler top. Facts about $SO(3)$ – Left invariant geodesics – Symmetry and reduction – Qualitative behavior of the reduced system – Analysis of the energy momentum map – Integration of the Euler-Arnol'd equations – The rotation number – A twisting phenomenon – Exercises – IV. The spherical pendulum. Liouville integrability – Reduction of the S^1 symmetry – The energy momentum mapping – Rotation number and first return time – Monodromy – Exercises – V. The Lagrange top. The basic model – Liouville integrability – reduction of the right S^1 action – Reduction of the left S^1 action – The Poisson structure – The Euler-Poisson equations – The energy momentum mapping – The Hamiltonian Hopf bifurcation – Exercises – Appendix A. Fundamental concepts. Symplectic linear algebra – Symplectic manifolds – Hamilton's equations – Poisson algebras and manifolds – Exercises – Appendix B. Systems with symmetry. Smooth group actions – Orbit spaces – Momentum mappings – Reduction: the regular case – Reduction: the singular case – Exercises – Appendix C. Ehresmann connections. Basic properties – The Ehresmann theorems – Exercises – Appendix D. Action angle coordinates. Local action angle coordinates – Monodromy – Exercises – Appendix E. Basic Morse theory. Preliminaries – The Morse lemma – The Morse isotopy lemma – Exercises – Notes – References – Acknowledgements – Index

Sheaf Theory. By Glen E. Bredon. Second Edition. (Springer-Verlag, Heidelberg 1997) 502 pp., DM 88.00, ISBN 0-387-94905-4

Chapter I. Sheaves and Presheaves. Definitions – Homomorphisms, subsheaves, and quotient sheaves – Direct and inverse image – Cohomomorphisms – Algebraic constructions – Supports – Classical cohomology theories – Exercises

Chapter II. Sheaf cohomology. Differential sheaves and resolutions – The canonical resolutions and sheaf cohomology – Injective sheaves – Acyclic sheaves – Flabby sheaves – Connected sequences of functors – Axioms for cohomology and the cup product – Maps of spaces – Φ -soft and Φ -fine sheaves – Subspaces – The Vietoris mapping theorem and homotopy invariance – Relative cohomology – Mayer-Vietoris theorems – Continuity – The Kenneth and universal coefficient theorems – Dimension – Local connectivity – Change of supports; local cohomology groups – The transfer homomorphisms and the Smith sequences – Steenrod's cyclic reduced powers – The Steenrod operations – Exercises

Chapter III. Comparison with Other Cohomology Theories. Singular cohomology – Alexander-Spanier cohomology – de Rham cohomology – Čech cohomology – Exercises

Chapter IV. Applications of Spectral Sequences. The spectral sequence of a differential sheaf – The fundamental theorems of sheaves – Direct image relative to a support family – The Leray sheaf – Extensions of a support family by a family on the base space – The Leray spectral sequence of a map – Fiber bundles – Dimensions – The spectral sequence of a filtered differential sheaf – The Fary spectral sequence – Sphere bundles with singularities – The Oliver transfer and the Conner conjecture – Exercises

Chapter V. Borel-Moore Homology. Cosheaves – The dual of a differential cosheaf – Homology theory – Maps of spaces – Subspaces and relative homology – The Vietoris theorem, homotopy,

and the covering spaces – The homology sheaf of a map – The basic spectral sequences – Poincaré duality – The cap product – Intersection theory – Uniqueness theorems – Uniqueness theorems for maps and relative homology – The Künneth formula – Change of rings – Generalized manifolds – Locally homogeneous spaces – Homological fibrations and p -adic transformation groups – The transfer homomorphism in homology – Smith theory in homology – Exercises

Chapter VI. Cosheaves and Čech Homology. Theory of cosheaves – Local triviality – Local isomorphisms – Čech homology – The reflector – Spectral sequences – Coresolutions – Relative Čech homology – Locally paracompact spaces – Borel-Moore homology – Acyclic coverings – Applications to maps – Exercises

A. Spectral Sequences . The spectral sequence of a filtered complex – Double complexes – Products – Homomorphisms

B. Solutions to Selected Exercises — Bibliography — List of Symbols — List of Selected Facts — Index

Fantasia Mathematica: being a set of stories, together with a group of oddments and diversions, all drawn from the universe of mathematics. Compiled and edited by Clifton Fadiman. Reprinted Edition (Springer-Verlag, New York, 1997) 298 pp.; DM 29.90.- ISBN 0-387-94931-3

Chapter I. Odd Numbers. Young Archidemedes – Pythagoras and the Psychoanalyst – Mother and the Decimal Point – Jurgen Proves It by Mathematics – Peter Learns Arithmetic – Socrates and the Slave – The Death of Archimedes

Chapter II. Imaginaries. The Devil an Simon Flagg – -And He Built a Crooked House – Inflexible Logic – No-Sided Professor – Superiority – The Mathematical Voodoo – Expedition – The Captured Cross-Section – A. Botts and the Moebius Strip – God and the Machine – The Tachypomp – The Island of Five Colors – The Last Magician – A Subway Named Moebius – The Universal Library – Postscript to “The Universal Library” – John Hones’s Dollar

Chapter III. Fractions. A New Ballad of Sir Patrick Spens – The Unfortunate Topologist – There Once Was a Breathy Baboon ... – Yet What Are All ... – Twinkle, Twinkle, Little Star – Mathematical Love – The Circle – The Circle and the Square – Euclid Alone Has Looked on Beauty Bare – Euclid – To Think That Two and Two Are Four – The Uses of Mathematics – Arithmetic – Threes (To Be Sung by Niels Bohr) – Plane Geometry – He Thought He Saw Electrons Swift – Fearsome Fable – Betrand Russell’s Dream – For All Practical Purposes – Eternity: A Nightmare – An Infinity of Guests – \inf – No Power on Earth – $(X + 1)$ – The Receptive Bosom – Leinbach’s Proof – Problem from *The New Yorker* “Talk of Town” – A Letter to Tennyson from *Mathematical Gazette* – A Fable from *Mathematical Gazette* – There Was a Young Man from Trinity – There Was an Old Man Who Said, “Do” – Relativity – There Was a Young Fellow Named Fisk