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concentrate on Hilbert spaces, specifically the spectral theorem for bounded as well as unbounded operators in separable Hilbert spaces. While the first two chapters are devoted to basic propositions concerning normed vector spaces and Hilbert spaces, the third chapter treats advanced topics which are perhaps not standard in a first course on functional analysis (a detour into operator algebras). The fourth chapter reverts to more standard operator theory in Hilbert space, dwelling on topics such as the spectral theorem for normal operators, the polar decomposition theorem, and the Fredholm theory for compact operators.

Calcul des variations

Andrea BRAIDES, Anneliese DEFRANCESCHI. — **Homogenization of multiple integrals.** — Oxford lecture series in mathematics and its applications, vol. 12. — Un vol. relié, 16,5×24, de xiv, 298 p. — ISBN 0-19-850246-X. — Prix: £40.00. — Clarendon Press, Oxford, 1998.

Homogenization results and appropriate descriptive formulae are given for periodic and almost periodic functionals. Applications are described to the asymptotic behaviour of oscillating energies describing cellular hyperelastic materials, porous media, materials with stiff and soft inclusions, and fibred media; to homogenization of Hamilton-Jacobi equations and Riemannian metrics, and to materials with multiple scales of microstructure and with multi-dimensional structure. There is a self-contained and up-to-date introduction to the relevant results of the direct methods of Γ -convergence and of the theory of weak lower semi-continuous integral functions that depend on vector-valued functions.

Jürgen JOST, Xianqing LI-JOST. — **Calculus of variations.** — Cambridge studies in advanced mathematics, vol. 64. — Un vol. relié, 16×23,5, de xvi, 323 p. — ISBN 0-521-64203-5. — Prix: £37.50. — Cambridge University Press, Cambridge, 1999.

One-dimensional problems and classical issues like Euler-Lagrange equations are treated, as are Noether's theorem, Hamilton-Jacobi theory, and in particular geodesic lines, thereby developing some important geometric and topological aspects. The basic ideas of optimal control theory are also given. The second part of the book deals with multiple integrals. After a review of Lebesgue integration, Banach and Hilbert space theory and Sobolev spaces (with complete details and proofs), there is a treatment of the direct methods and the fundamental lower semi-continuity theorems. Subsequent chapters introduce the basic concepts of the modern calculus of variations, namely relaxation, Gamma convergence, bifurcation theory and minimax methods based on the Palais-Smale condition.

Géométrie

Jack B. KUIPERS. — **Quaternions and rotation sequences: a primer with applications to orbits, aerospace, and virtual reality.** — Un vol. relié, 20×26, de xxii, 371 p. — ISBN 0-691-05872-5. — Prix: £35.00. — Princeton University Press, Princeton, distributed by John Wiley & Sons, Chichester, 1999.

In this book, the author introduces quaternions for scientists and engineers who have not encountered them before and shows how they can be used in a variety of practical situations. The opening chapters present introductory material and establish the book's terminology and notation. The next part presents the mathematical properties of quaternions, including quaternion algebra and geometry. It includes more advanced special topics in spherical trigonometry, along with an introduction to quaternion calculus and perturbation theory. In the final section, the author discusses state-of-the-art applications.