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Kapitel: Calcul des variations et contrôle optimal

Théorie des opérateurs

G. BELITSKII, V. TKACHENKO. — **One-dimensional functional equations.** — Operator theory: advances and applications, vol. 144. — Un vol. relié, 17×24, de XIV, 206 p. — ISBN 3-7643-0084-1. — Prix: SFr. 156.00. — Birkhäuser, Basel, 2003.

This monograph is devoted to the study of functional equations with the transformed argument on the real line and on the unit circle. Such equations systematically arise in dynamical systems, differential equations, probabilities, singularities of smooth mappings, and other areas. The purpose of the book is to present modern methods and new results in the subject, with an emphasis on a connection between local and global solvability. The general concepts developed in the book are applicable to multidimensional functional equations. Some of the methods are presented for the first time in the monograph literature, in particular, a functional parametrization of local mappings, the gluing of local solutions, and a decomposition method.

Reinhard MENNICKEN, Manfred MÖLLER. — **Non-self-adjoint boundary eigenvalue problems.** — North-Holland mathematics studies, vol. 192. — Un vol. relié, 17×24,5, de XVIII, 500 p. — ISBN 0-444-51447-3. — Prix: € 105.00. — Elsevier, Amsterdam, 2003.

This monograph provides a comprehensive treatment of expansion theorems for regular systems of first order differential equations and n-th order ordinary differential equations. In 10 chapters and one appendix, it provides a comprehensive treatment from abstract foundations to applications in physics and engineering. The focus is on non-self-adjoint problems. Bounded operators are associated to these problems, and Chapter 1 provides an in depth investigation of eigenfunctions and associated functions for bounded Fredholm valued operators in Banach spaces. Since every n-th order differential equation is equivalent to a first order system, the main techniques are developed for systems. Asymptotic fundamental systems are derived for a large class of systems of differential equations. Together with boundary conditions, which may depend polynomially on the eigenvalue parameter, this leads to the definition of Birkhoff and Stone regular eigenvalue problems. An effort is made to make the conditions relatively easily verifiable... the contour integral method and estimates of the resolvent are used to prove expansion theorems. For Stone regular problems, not all functions are expandable, and again relatively easily verifiable conditions are given, in terms of auxiliary boundary conditions, for functions to be expandable. The last chapter deals exclusively with applications.

Calcul des variations et contrôle optimal

Gerhard-Wilhelm WEBER. — **Generalized semi-infinite optimization and related topics.** — Research and exposition in mathematics, vol. 29. — Un vol. broché, 17×24, de 361 p. — ISBN 3-88538-229-6. — Prix: € 40.00. — Heldermann Verlag, Lemgo, 2003.

A very general class of nonlinear programming programs became of increasing interest in the last years. The interest of the author focuses on these so-called generalized semi-infinite optimization problems. He studies basic properties and unfolding iterative concepts for approximately solving them and applies insight and methods to related problems from optimal control and discrete optimization. — *Contents:* Representations and optimality. — Topological and stability properties. — Concepts of iteration procedures. — Optimal control and discrete mathematics.