García-Pacheco, Francisco Javier

Abstract calculus. A categorical approach. (English) Zbl 07390285

Monographs and Research Notes in Mathematics. Boca Raton, FL: CRC Press (ISBN 978-0-367-76220-9/hbk; 978-0-367-76342-8/pbk; 978-1-003-16655-9/ebook). xx, 375 p. (2022)

Assuming set theory, general topology and abstract algebra as prerequisites, this book deals with calculus, differing from other standard ones in the following points.

- The book covers the exact same topics but from a categorical viewpoint, taking the category of topological modules as the main category.
- *Limits* are approached from the perspective of filters and nets in partially ordered sets.
- *Continuity* is addressed from the perspective of topological spaces and metric spaces.
- *Differentiability* is considered in the setting of topological modules over topological rings, with a special emphasis on seminormed modules over seminormed rings.
- *Optimization* is boarded from the standpoint of real topological vector spaces and seminormed modules over seminormed rings.
- *Integrability* is reconstructed from the basics of effect algebras and Boolean algebras.
- *Summability* is discussed within the setting of topological modules.
- *Approximation* is addressed within the framework of compact metric spaces and real normed spaces.

Reviewer: Hirokazu Nishimura (Tsukuba)

MSC:

18-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to category theory
26-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to real functions

Full Text: DOI