

[Swartz, Charles](#)

Introduction to gauge integrals. (English) Zbl 0982.26006
Singapore: World Scientific. x, 157 p. (2001).

Since its introduction by Jaroslaw Kurzweil and Ralph Henstock about forty years ago, the number of monographs about the gauge or Kurzweil-Henstock integral (a modification of Riemann's definition providing a Denjoy-Perron integral) has been steadily increasing.

Swartz book is a very valuable addition to this literature, starting with the one-dimensional case on bounded and then on unbounded intervals. After proving the corresponding convergence theorems from the so-called uniform integrability condition, the author deals with integration over more general subsets of the real line and with the structure of the set of Kurzweil-Henstock integrable functions. Multiple Kurzweil-Henstock integrals are then defined and the corresponding Fubini theorems are proved. The book ends with the McShane integral, a slight modification of the Kurzweil-Henstock definition leading to an integral equivalent to Lebesgue's one.

Some appendices deal with the Riemann integral, functions of bounded variation, the differentiation of indefinite integrals, the equivalence between McShane and Lebesgue integral and the change of variables in multiple integrals. Each chapter is followed by a set of exercises and the reference to the literature is exceptionally rich and accurate.

Reviewer: [J.Mawhin \(Louvain-La-Neuve\)](#)

MSC:

[26A39](#) Denjoy and Perron integrals, other special integrals
[26-01](#) Introductory exposition (textbooks, tutorial papers, etc.) pertaining to real functions

Cited in 1 Review
Cited in 20 Documents

Keywords:

[gauge integrals](#); [Kurzweil-Henstock integral](#); [Fubini theorems](#); [McShane integral](#); [Riemann integral](#); [functions of bounded variation](#); [Lebesgue integral](#); [change of variables](#); [multiple integrals](#)