1. Record Nr. UNINA9910770243803321

Autore	Gouvêa Fernando Q
Titolo	A Short Book on Long Sums : Infinite Series for Calculus Students / / by Fernando Q. Gouvêa
Pubbl/distr/stampa	Cham : , : Springer Nature Switzerland : , : Imprint : Springer, , 2023
ISBN	3-031-37557-2
Edizione	[1st ed. 2023.]
Descrizione fisica	1 online resource (153 pages)
Collana	Readings in Mathematics, , 2945-5847
Disciplina	515
Soggetti	Sequences (Mathematics) Mathematical analysis Functions of real variables Successions (Matemàtica) Anàlisi matemàtica Funcions de variables reals Sequences, Series, Summability Analysis Real Functions Llibres electrònics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	- To the reader -- Getting close with lines -- Getting closer with polynomials -- Going all the way: Convergence -- Power series -- Distant mountains -- Appendix A: SageMath: A (very) short introduction -- Appendix B: Why I do it this way -- Bibliography.
Sommario/riassunto	This concise textbook introduces calculus students to power series through an informal and captivating narrative that avoids formal proofs but emphasizes understanding the fundamental ideas. Power series—and infinite series in general—are a fundamental tool of pure and applied mathematics. The problems focus on ideas, applications, and creative thinking instead of being repetitive and procedural. Calculus is about functions, so the book turns on two fundamental ideas: using polynomials to approximate a function and representing a function in terms of simpler functions. The derivative is reinterpreted in terms of

linear approximations, which then leads to Taylor polynomials and the question of convergence. Enough of the theory of convergence is developed to allow a more complete understanding of power series and their applications. A final chapter looks at the distant horizon and discusses other kinds of series representations. SageMath, a free open-source mathematics software system, is used throughout to do computations, provide examples, and create many graphs. While most problems do not require SageMath, students are encouraged to use it where appropriate. An instructor's guide with solutions to all the problems is available. The book is intended as a supplementary textbook for calculus courses; lecturers and instructors will find innovative and engaging ways to teach this topic. The informal and conversational tone make the book useful to any student seeking to understand this essential aspect of analysis.