1. Record Nr. UNINA9911064736703321

Autore	Robinson Michael
Titolo	Computational Homological Algebra / / by Michael Robinson
Pubbl/distr/stampa	Cham : , : Springer Nature Switzerland : , : Imprint : Springer, , 2026
ISBN	3-032-08634-5
Edizione	[1st ed. 2026.]
Descrizione fisica	1 online resource (567 pages)
Collana	Mathematical Engineering, , 2192-4740
Disciplina	620.00151
Soggetti	Engineering mathematics Algebra Engineering Mathematics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Quotients of vector spaces -- Sequences and chain complexes -- Chain maps -- Abstract simplicial complexes -- Simplicial homology and homotopy -- Sequences and chain complexes of sequences.
Sommario/riassunto	This book is an attempt to reduce the barrier to entry for the key tools of homological algebra and develops the basic notions of homological algebra by emphasizing concrete, elementary, and computational examples in finite dimensional vector spaces. Linear algebra is the study of linear maps between vector spaces. The broad success of linear algebra in applications is due to the dimension theorem and the algorithms that exploit it, like Gaussian elimination and QR factorizations. Homological algebra is the study of what happens when linear maps are chained together, one after the next. Unlike linear algebra, homological algebra is little known outside of mathematics, but is poised to become useful in engineering and data science. The material covered in this book can be used for a one semester elementary course in computational homological algebra, but could also comfortably occupy a two-semester sequence. This book is written for mid-division undergraduate students who have a solid background in linear algebra, but no background in abstract algebra, topology, or category theory. Instead readers build insight by computation. By working the examples and exercises, the requisite background material is covered as needed, and the powerful tools of homological algebra

are unlocked.