1.	Record Nr.	UNINA9910300142003321
	Autore	Eidelman Yuli
	Titolo	Separable type representations of matrices and fast algorithms : volume 1 basics. completion problems. multiplication and inversion algorithms / / by Yuli Eidelman, Israel Gohberg, Iulian Haimovici
	Pubbl/distr/stampa	Basel : , : Springer Basel : , : Imprint : Birkhäuser, , 2014
	ISBN	3-0348-0606-X
	Edizione	[1st ed. 2014.]
	Descrizione fisica	1 online resource (404 p.)
	Collana	Operator Theory: Advances and Applications, , 0255-0156 ; ; 234
	Disciplina	512.9434
	Soggetti	Matrix theory Algebra Numerical analysis Linear and Multilinear Algebras, Matrix Theory Numerical Analysis
	Lingua di pubblicazione	Inglese
	Formato	Materiale a stampa
	Livello bibliografico	Monografia
	Note generali	Description based upon print version of record.
	Nota di bibliografia	Includes bibliographical references and index.
	Nota di contenuto	Part 1. Basics on separable, semiseparable and quasiseparable representations of matrices -- 1. Matrices with separable representation and low complexity algorithms -- 2. The minimal rank completion problem -- 3. Matrices in diagonal plus semiseparable form -- 4. Quasiseparable representations: the basics -- 5. Quasiseparable generators -- 6. Rank numbers of pairs of mutually inverse matrices, Asplund theorems -- 7. Unitary matrices with quasiseparable representations -- Part 2. Completion of matrices with specified bands -- 8. Completion to Green matrices -- 9. Completion to matrices with band inverses and with minimal ranks -- 10. Completion of special types of matrices -- 11. Completion of mutually inverse matrices -- 12. Completion to unitary matrices -- Part 3. Quasiseparable representations of matrices, descriptor systems with boundary conditions and first applications -- 13. Quasiseparable representations and descriptor systems with boundary conditions -- 14. The first inversion algorithms -- 15. Inversion of matrices in diagonal plus semiseparable form -- 16. Quasiseparable/semiseparable representations and one-direction systems -- 17. Multiplication of

matrices -- Part 4. Factorization and inversion -- 18. The LDU factorization and inversion -- 19. Scalar matrices with quasiseparable order one -- 20. The QR factorization based method.

Sommario/riassunto

This two-volume work presents a systematic theoretical and computational study of several types of generalizations of separable matrices. The primary focus is on fast algorithms (many of linear complexity) for matrices in semiseparable, quasiseparable, band and companion form. The work examines algorithms of multiplication, inversion and description of eigenstructure and includes a wealth of illustrative examples throughout the different chapters. The first volume consists of four parts. The first part is mainly theoretical in character, introducing and studying the quasiseparable and semiseparable representations of matrices and minimal rank completion problems. Three further completions are treated in the second part. The first applications of the quasiseparable and semiseparable structure are included in the third part, where the interplay between the quasiseparable structure and discrete time varying linear systems with boundary conditions play an essential role. The fourth part includes factorization and inversion fast algorithms for matrices via quasiseparable and semiseparable structures. The work is based mostly on results obtained by the authors and their coauthors. Due to its many significant applications and accessible style, the text will be a valuable resource for engineers, scientists, numerical analysts, computer scientists and mathematicians alike.