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Titolo	Exercises in Numerical Linear Algebra and Matrix Factorizations // by Tom Lyche, Georg Muntingh, Øyvind Ryan
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Soggetti	Algebras, Linear Algorithms Mathematics - Data processing Numerical analysis Linear Algebra Computational Science and Engineering Numerical Analysis
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Nota di contenuto	A Short Review of Linear Algebra -- Diagonally Dominant Tridiagonal Matrices; Three Examples -- Gaussian Elimination and LU Factorizations -- LDL* Factorization and Positive Definite Matrices -- Orthonormal and Unitary Transformations -- Eigenpairs and Similarity Transformations -- The Singular Value Decomposition -- Matrix Norms and Perturbation Theory for Linear Systems -- Least Squares -- The Kronecker Product -- Fast Direct Solution of a Large Linear System -- The Classical Iterative Methods -- The Conjugate Gradient Method -- Numerical Eigenvalue Problems -- The QR Algorithm.
Sommario/riassunto	To put the world of linear algebra to advanced use, it is not enough to merely understand the theory; there is a significant gap between the theory of linear algebra and its myriad expressions in nearly every computational domain. To bridge this gap, it is essential to process the theory by solving many exercises, thus obtaining a firmer grasp of its diverse applications. Similarly, from a theoretical perspective, diving into the literature on advanced linear algebra often reveals more and

more topics that are deferred to exercises instead of being treated in the main text. As exercises grow more complex and numerous, it becomes increasingly important to provide supporting material and guidelines on how to solve them, supporting students' learning process. This book provides precisely this type of supporting material for the textbook "Numerical Linear Algebra and Matrix Factorizations," published as Vol. 22 of Springer's Texts in Computational Science and Engineering series. Instead of omitting details or merely providing rough outlines, this book offers detailed proofs, and connects the solutions to the corresponding results in the textbook. For the algorithmic exercises the utmost level of detail is provided in the form of MATLAB implementations. Both the textbook and solutions are self-contained. This book and the textbook are of similar length, demonstrating that solutions should not be considered a minor aspect when learning at advanced levels.
