

Linear Algebra



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著者:Peter D. Lax

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This introduction to linear algebra by world-renowned mathematician Peter Lax is unique in its emphasis on the analytical aspects of the subject as well as its numerous applications. The book grew out of Dr. Lax's course notes for the linear algebra classes he teaches at New York University. Geared to graduate students as well as advanced undergraduates, it assumes only limited knowledge of linear algebra and avoids subjects already heavily treated in other textbooks. And while it discusses linear equations, matrices, determinants, and vector spaces, it also includes a number of exciting topics that are not covered elsewhere, such as eigenvalues, the Hahn-Banach theorem, geometry, game theory, and numerical analysis.

The first four chapters are devoted to the abstract structure of finite dimensional vector spaces. Subsequent chapters deal with determinants as a blend of geometry, algebra, and general spectral theory. Euclidean structure is used to explain the notion of selfadjoint mappings and their spectral theory. Dr. Lax moves on to the calculus of vector and matrix valued functions of a single variable—a neglected topic in most undergraduate programs—and presents matrix inequalities from a variety of perspectives.

Fundamentals—including duality, linear mappings, and matrices

Determinant, trace, and spectral theory

Euclidean structure and the spectral theory of selfadjoint maps

Calculus of vector and matrix valued functions

Matrix inequalities

Kinematics and dynamics

Convexity and the duality theorem

Normed linear spaces, linear mappings between normed spaces, and positive matrices

Iterative methods for solving systems of linear equations

Eight appendices devoted to important related topics, including special determinants, Pfaff's theorem, symplectic matrices, tensor product, lattices, fast matrix multiplication, Gershgorin's theorem, and multiplicity of eigenvalues

Later chapters cover convexity and the duality theorem, describe the basics of normed linear spaces and linear maps between normed spaces, and discuss the dominant eigenvalue of matrices whose entries are positive or merely non-negative. The final chapter is devoted to numerical methods and describes Lanczos' procedure for inverting a symmetric, positive definite matrix. Eight appendices cover important topics that do not fit into the main thread of the book.

Clear, concise, and superbly organized, Linear Algebra is an excellent text for advanced undergraduate and graduate courses and also serves as a handy professional reference.

作者介绍:

Peter D. Lax

当代最杰出的数学家之一，世界数学界最高荣誉阿贝尔奖（2005年）和沃尔夫奖（1987年）得主。他是美国科学院院士，并于1986年荣获美国国家科技奖章。Lax生于匈牙利，自1958年开始就一直在美国纽约大学从事教学与研究，曾担任柯朗数学研究所所长。他在纯数学与应用数学的诸多领域都有卓越的建树，影响深远。同时，他一生致力于数学教育，独立撰写或与他人合著教材20多部，阿贝尔奖颁奖辞如此评价他：“他的著作、他对教育事业付出的毕生心血以及他在培养年轻一代数学家时体现出的孜孜不倦的精神，在世界数学领域留下了不可磨灭的影响。”

目录:

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评论

大神Peter Lax这本书里这个讲解视角真的有一览众山小的感觉。

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书评

Lay的那本属于从直观背景出发逐渐构造体系，总的说是一些基础的计算，例子多，所以写得很厚，从内容上说相当于我国工科线性代数。
Lax这本书是比较高观点的理论型书籍，很多东西力图在抽象层次上洞悉本质，许多地方让你感觉“本来就该如此的，线性代数的本质就是如此，为什么...”

Lax老先生在书中“知无不言”地倾注了他一直到写书那一刻学习数学的理解和体会，其实自己看不大懂也没看完，印象深刻的是那个谐振子的微分方程，老先生不愧为微分方程方面的专家，说弹簧振动的微分方程的通解是线性空间的典范，举的例子都是非平凡的，不知道别的人写的书都是用...

Peter David Lax (born 1 May 1926 in Budapest, Hungary) is a mathematician working in the areas of pure and applied mathematics. He has made important contributions to integrable systems, fluid dynamics and shock waves, solitonic physics, hyperbolic conser...

书的第二版的内容挺丰富的——我只是对比了它们的页数：373vs272。
豆瓣告诉我说：“抱歉，你的评论太短了”，那我再加一点儿。原版书的内容确实做得比我们自己的书踏实多了。不敢妄加评论书的好坏。只说原作者是一位成就不俗的数学家。书写得也是有理有据，只是...

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