

**Applied Linear Algebra
de Boor
Book proposal for Springer**

This is an introduction to linear algebra that seems to be aimed at beginning mathematics undergraduate students. (No proposal form was provided, nor a preface, so I have to deduce from the manuscript the author's intended audience.) It is unlike any other book I have seen and clearly presents the author's personal view on how the subject should be taught. The author is a leading researcher and experienced book writer, and has used linear algebra significantly in his research, so it is very interesting to see his take on the introductory linear algebra text.

My main impression is that this is a book caught in a time warp. It might have been suited to a course 20 years ago, when its abstract and austere form could have been acceptable. But I can't see any mainstream use for the book nowadays. In the European university where I work, the book would be seen as far too difficult, abstract and unfriendly for course adoption or recommendation. Among the many competitors in the "applied linear algebra" vein are:

- Meyer [2], which like this MS, includes some more advanced topics such as Perron–Frobenius theory, but is less abstract and much more reader-friendly.
- Strang [3], which is the antithesis of this MS in its concreteness and avoidance of unnecessary abstraction.

I'm afraid I just cannot see a market for the present book in this, one of the most competitive areas of mathematics textbook publishing.

The MS reminds me of Lax's book [1], which was an equally personal view of linear algebra. The difference is that his book was at the graduate level, and so a stronger case for its publication could presumably be made.

Some specific comments:

1. The book begins with a list of definitions and then jumps immediately into the abstract concept of "assignment", which I feel is unnecessary and would confuse many students. Nowadays it is mandatory for linear algebra texts to include motivating examples, placed as early as possible, but this MS has none.
2. Snippets of MATLAB appear every now and then (e.g., top of p. 3) for no apparent reason. The author does not develop the use of MATLAB at all and gives only the occasional MATLAB exercise.

3. Nonstandard notation is used: “#” (p. 5) and “dot atop plus sign” (p. 53), which would not help persuade instructors to adopt the text.
4. The definition of condition number on p. 77 is nonstandard (and does not generalize nicely to other problems).
5. The statement at the bottom of p. 88 about the rounding errors being proportional to the condition of the factors is incorrect. Given that the author has previously written very cogently about rounding errors in linear equation solving this lapse is puzzling.

In conclusion, I appreciate having had the opportunity to see the author’s original way of presenting linear algebra. It is perhaps a sad reflection on today’s student that I feel the book lacks a market.

References

- [1] Peter D. Lax. *Linear Algebra*. Wiley, New York, 1997. xiv+250 pp. ISBN 0-471-11111-2.
- [2] Carl D. Meyer. *Matrix Analysis and Applied Linear Algebra*. Society for Industrial and Applied Mathematics, Philadelphia, PA, USA, 2000. xii+718 pp. ISBN 0-89871-454-0.
- [3] Gilbert Strang. *Introduction to Linear Algebra*. Third edition, Wellesley-Cambridge Press, Wellesley, MA, USA, 2003. viii+568 pp. ISBN 0-9614088-9-8.